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A SUCCESSFUL CASE OF SEPTUPLE BOWEL RESECTION AND SEXTUPLE ANASTOMOSIS.

WITH AN ACCOUNT OF SOME PERSONAL MULTIPLE AND COMPLICATED INTESTINAL RESECTIONS.

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THE gravity of intestinal resection and anastomosis will to a degree be influenced by the numerical quota of lines of surgical suture, but the operative prognosis is by no means a matter of such simple mathematical calculation, and is dependent upon a number of causal agencies, of which the multiplicity and the complexity of bowel resection constitute but two determining factors. The pathological lesion which demands for its effective treatment a multiple or complex intestinal resection is doubtless severe, betokening extensive local disease or devastating injury; but the outcome of the operation may furthermore be affected prejudicially by such other ætiological factors as may constitute the patient a "bad surgical risk", and more especially by any constitutional effects which the malady or trauma may have already produced in the sufferer. These general systemic consequences of the condition for which so-called "heroic surgery" has been performed or is envisaged, may possibly be effectively combated by appropriate methods of ancillary therapy. Poppert, quoted by Mikulicz,[1] seems to hold the numerical record in respect of successful multi-segmental intestinal resection; his patient, who had been wounded by a pistol shot, survived a quintuple bowel removal.

A curious anatomical error on the part of an operator more thoroughly versed in another branch of surgery provided me with the opportunity of operating on a case in which a septuple resection and a sextuple anastomosis of intestine were required, and in which a successful result eventuated.

CASE I. A.H. was originally operated on for intestinal obstruction in a small country hospital. An incision was made in the left iliac fossa and a supposed left inguinal colostomy was practised; a growth was said to have been present in the left-sided colon. As subsequent events proved, the piece of bowel selected and opened proved to be far remote from that most usually selected by surgeons when a colostomy in this situation is performed; and this mistake not only led to great procrastination in extirpating the neoplasm of the pelvic colon which was in fact the cause of obstruction, but the original error was also indirectly responsible for the multiple resection of bowel which preceded by some weeks the removal of this primary growth of the sigmoid, this latter constituting the seventh segment of the intestinal canal ablated in the unfortunate woman.

The patient, a maiden lady of sixty-four years, was transferred to my care in London. Her frame was feeble and her physique most frail; she was thin and emaciated, and suffered pain and distress from the copious discharge from the artificial anus in her left iliac fossa, and from numerous fistulous openings and dripping sinuses around it. She was the possessor of one of the most severely infected intestinal openings deliberately planned that it has been my lot to behold. Pus poured from the tissues around the attachment of the bowel to the parietes, and the skin was sorely excoriated. The customary efforts made to improve the condition of the integument and to control the sepsis were almost unavailing. The resources of pharmacology, bacteriology, biochemistry and physical therapy were invoked, but the results effected by the workers in these special departments proved disappointingly disproportionate to the zeal and the painstaking trouble which characterized their cooperation in the case.

After many weeks of exasperating delay, during which the general condition of the lady steadily deteriorated, I felt compelled, despite the sepsis, to explore the abdomen before the state of the patient became such as to preclude surgery of a radical character. The original wound was provokingly situated in the line of that iliac incision which I prefer to employ for the removal of a carcinomatous growth of the left-sided colon. Nevertheless, the artificial stoma having been dissected free and temporarily closed, the original wound was slightly enlarged and deepened. It was trusted that, despite the wastage of weeks, it would still be possible to mobilize and deliver the colonic growth discovered by the original operator, and to resect it by some modification of the Paul-Mikulicz technique; and that by confining surgical incursion to the left iliac quadrant of the abdomen, no fatal spreading peritonitis would ensue.

Exploration revealed in the depths of the wound a conglomerate mass of intestine stuck together under the abdominal wall, to which also the bowel was adherent, and more laxly connected with this entero-colic tumour were two ovarian cysts of inconsiderable dimensions (Figure I). The disentanglement of this congeries of agglutinated intestinal coils, some crackling with gas and some distended with fluid, seemed fraught with grave danger of bowel damage and with considerable prospect of setting alight a septic conflagration inside the abdomen, which would terminate fatally. It was therefore thought that the safer policy would be the resection of the whole mass, which involved of course the artificial opening made at the previous operation and closed as a preliminary procedure at the commencement of this second operation on the patient.

The ablation of the tumour left twelve open bowel ends to be dealt with, of which four belonged topographically to the colon and eight to the small intestine. The prospect of two operative junctions of the large bowel and four of the small intestine now confronted us. The removal of an additional piece of small intestine still attached by its mesentery and interjacent between two other segments of longer dimension, reduced the number of small intestine anastomoses required to three. Three circular enterorrhaphies of the small bowel were therefore performed, and two end-to-end anastomoses of the large intestine, involving the transverse and the iliac colon respectively. A prophylactic caecostomy was effected at the end of the operation, the bowel being brought to the surface of the body and not merely intubated. A transfusion of a sister's

blood was given, and, despite her years and enfeeblement, the lady made a good recovery from the immediate effects of the operation, and her general state of health and the condition of the tissues slowly, steadily and surely improved.

An investigation of the specimen revealed this extraordinary explanation of all the vexatious misery and distress that the unfortunate patient had suffered, and of the dire excoriation of the skin for so many inches around the so-called colostomy. The former operator had at the first emergency failed to distinguish the small from the large bowel and what had been deemed a colostomy was in very truth an enterostomy. The severity of the cutaneous lesions, the markedly progressive deterioration in general health and the loss of weight would seem to indicate that the piece of small bowel which had been so unfortunately selected and utilized for the vent at the time of the emergency was fairly high up the small gut, but no attempt was made at my first, and the patient's second, operation to identify the exact topographical position of the segments of small intestine which required anastomosis.

The pathological characters of the mass of bowel removed at this operation, and the absence of any neoplastic tissue in the various segments of gut of which the tumour was constituted, encouraged the hope that the cause of the initial obstruction was inflammatory and not of a malignant character, as had been feared by the first operator. The distal portion of the iliac colon, which was utilized in the most caudally situated of the various anastomoses, did not suggest any obstruction lower down the larger intestine, but no systematic exploration of the contents of the abdomen was practised in view of the dangerous sepsis present.

A subsequent sigmoidoscopy revealed no evidence of a malignant stricture, but the instrument could not be introduced further than eight inches; it was thought that adhesions resulting from the two preceding operations had interfered with the mobility of the sigmoid.

The caecostomy was acting freely, but flatus and a fæcal result were also obtained by means of small enemata.

An operation performed to close the caecostomy was followed by abdominal distension, great unrest and vomiting, and although flatus was passed *per anum* in response to glycerine enemata, no satisfactory fæcal evacuation was obtained. The symptoms were instantly relieved on reopening the caecostomy; and it appeared obvious that there was still some obstruction present in the large bowel.

A barium enema was not retained, but the patient by this time was, perhaps not unnaturally, very intolerant of any measures involving the slightest discomfort, and fiercely resented any method of investigation made for her welfare. A sigmoidoscopy, performed perforce under anæsthesia, revealed the same difficulty in introducing the instrument further than eight inches, as had been noted before, but no sign of a neoplasm was observed. It was clear that before any further attempts to close the caecostomy were made, a more thorough exploration of the abdomen would be necessary—an operative procedure upon which the patient herself was most insistent.

The abdomen was explored through a median subumbilical incision, and a very small annular constricting growth of the pelvic colon was found (Figure II), which narrowly escaped being overlooked. The situation of the stricture corresponded to the point where the passage of the sigmoidoscope had been impeded, some eight inches from the anus. The growth was removed by exteriorization-resection, the seventh segment of bowel ablated.

The "spur" was subsequently clamped; the opening in the bowel was sutured a few weeks after, whereby the sixth anastomosis was completed. At length the caecostomy was finally and permanently closed.

Even if the first operator were guilty of an elementary anatomical mistake, my judgement may be criticized for closing the caecostomy on the first occasion without having absolute assurance that no obstruction existed in the large bowel. The big inflammatory mass removed on the left side strongly suggested itself as the primary cause of the obstruction. A false deduction was drawn from sigmoidoscopy, and a hazard was taken which failed, but which might nevertheless have proved the patient's undoing.

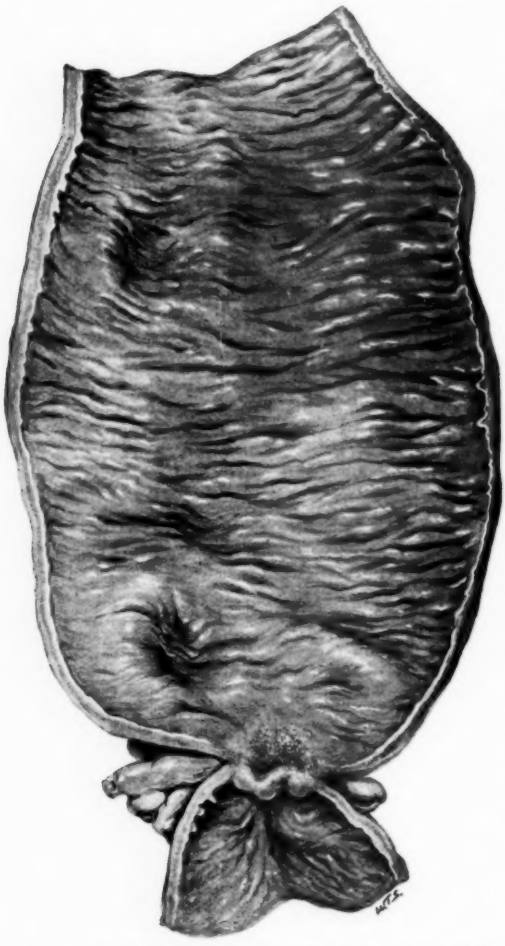

FIGURE II. Carcinoma of sigmoid, which was the real cause of the intestinal obstruction, for which patient was originally operated on.

The experience of this successful case has prompted me to re-investigate some of my cases of complicated resections of the alimentary canal for cancer, and I have also reviewed my own experience of multiple and complex resections for conditions which were either traumatic or which owned a non-cancerous pathology.

Multiple or complicated resection of bowel may be demanded for the following pathological conditions:

A. Malignant disease.

B. Severe involvement of the bowel in pelvic pathology.

C. Tuberculosis of the intestine.

D. Non-tuberculous infective granuloma of the intestine.

E. Certain forms of acute intestinal obstruction, if gangrene has occurred.

F. Gunshot wounds of the abdomen and other injuries.

G. Anastomotic ulcers consequent on gastro-jejunostomy and met very occasionally after gastrectomy.

H. Utilitarian, restorative or conservative resections.

I. Recurrent resections.

A. PLURI-SEGMENTAL OR COMPLEX RESECTIONS FOR CANCER OF THE BOWEL.

Rankin and Olson,[2] while pointing out that local fixation of a colonic growth does not rule out resection, and that "many patients with neoplasms which have shown at resection invaded lymphatic glands, have lived long and useful lives without recurrence", nevertheless seem to regard the surgery of colonic growths with involvement of the abdominal wall or of other viscera as merely palliative. These authors remark that such operations are undertaken with huge operative risk, and that extensive care should be exercised to weigh the problematic advantages and possible disadvantages of exposing the patient to a greater hazard. It is refreshing to turn from this somewhat pessimistic pronouncement to some of Grey-Turner's[3] writings and to a recent contribution by Wilkie[4] on the subject. Those who require encouragement in their surgery of bowel cancer will find it in these papers, and with the object of still further heartening younger surgeons to deal ruthlessly with malignant disease of the bowel, these personal experiences are set forth here. There is at least this comforting reflection, that in the case of complicated and pluri-segmental removal of the bowel for cancer, the immediate risk to life does not appear to be greatly increased by bolder adventure. The debatable point concerns the prospect of prolonged survival after these complex procedures. Are we to regard such extirpations as merely palliative? Do they really afford us real hope of cure? Surprising results often occur when they are least expected, and it must be remembered that even the most modern grading in malignant histology does not always endow us with the gift of accurate prophecy.

A record of these few successes may furnish a stimulus to those who may think that neither they nor their patients will reap the reward of enterprise.

The cases of complicated or multiple resection of bowel for cancer may be considered under the following headings:[1]

1. Where a growth of the large intestine has involved the abdominal wall only.

2. Where a growth of the large intestine has implicated coils of small or of large intestine, or has even involved both portions of bowel.

[1] It is obvious that some of the cases will belong to more than one category.

3. When some other segment of the alimentary canal is implicated in the growth, such as the stomach.

4. Where a solid viscus or some hollow viscus unconnected with the alimentary canal is involved, such as the bladder, ureter *et cetera*.

5. There is still another group of cases in which a multiple resection has perforce to be performed, not because the additional segment of the alimentary canal is involved by direct extension of the primary neoplasm, but because of some complicating or accidental circumstance unconnected with the primary newgrowth, for example, the case of septuple resection which furnishes the first case in this paper *et cetera*.

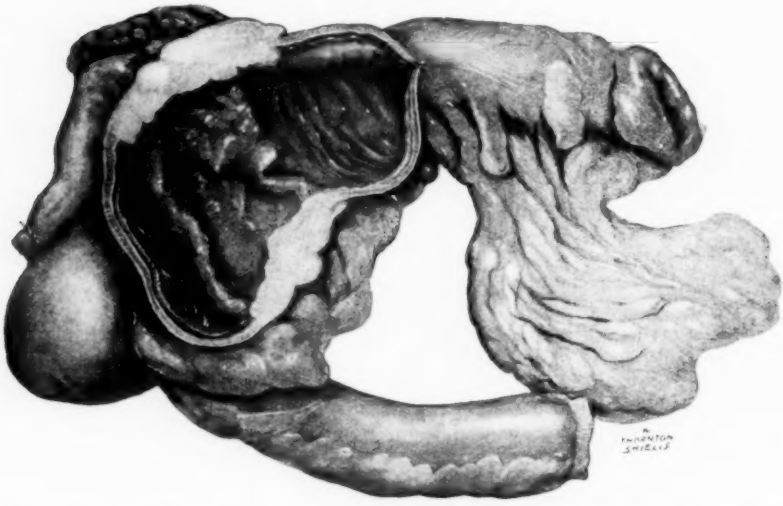

FIGURE III. Case II. Carcinoma of caecum and ascending colon, extensively infiltrating lateral abdominal wall; all layers except skin and subcutaneous tissues were excised with the growth. The patient was well four years later.

Group 1.

Group 1 includes cases with involvement of the abdominal wall.

Case II was one of carcinoma of the caecum and ascending colon, with extensive involvement of the lateral abdominal wall (Figure III).

CASE II. Mrs. C., aged forty-five years, was in poor condition when operated upon. She had been under "treatment" at a private institution which exploited a fruit diet as a cure for all ills! A fæcal fistula followed the operation, necessitating subsequent surgery to effect a closure. At this second intervention another segment of bowel required ablation, but no sign of growth was fortunately present, and the patient is in good health four years after operation.

Case III was one of carcinoma of the pelvic colon, involving the abdominal wall, the left tube and ovary (Figure IV).

CASE III. Mrs. R., aged sixty years, was operated on for acute intestinal obstruction. Blind caecostomy was performed, the malignant mass subsequently resected and the caecostomy was finally closed. The patient is in excellent health eight years later.

Case IV was one of carcinoma of the pelvic colon, involving the abdominal wall, uterus and left adnexa.

CASE IV. Mrs. T., aged fifty-five years, was operated on for acute intestinal obstruction. Laparotomy was undertaken, the wound was closed and caecostomy was performed. At a second operation the growth in the pelvic colon was removed with a section of the bowel; the uterus and the appendages were removed. The caecostomy was closed. The patient is alive and well eight years later.

Case V was one of carcinoma of the pelvic colon, involving abdominal wall and left tube and ovary.

CASE V. Mrs. F., aged sixty years, suffered from acute intestinal obstruction. The growth was resected by the exteriorization method combined with caecostomy. The continuity of the bowel was restored and the caecostomy was closed. The patient is alive and well four years later.

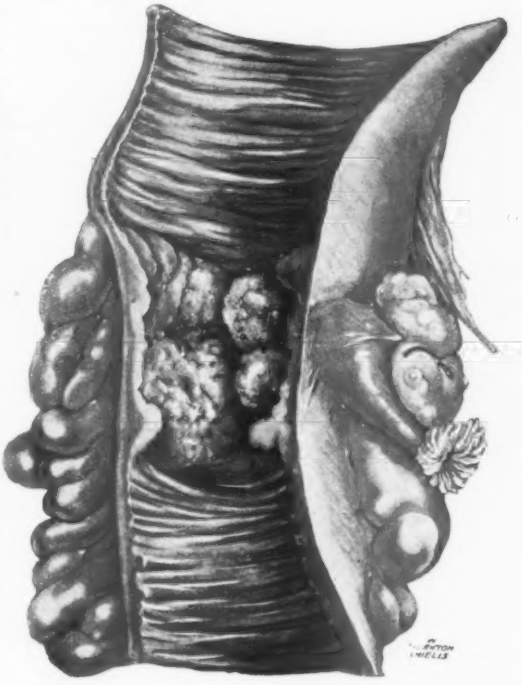

FIGURE IV. Case V. Carcinoma of pelvic colon involving abdominal wall and left tube and ovary. Patient well four years later.

Group 2.

Group 2 includes cases in which a large intestine growth has implicated coils of small intestine or another segment of large bowel, or both of these portions of the alimentary tube.

Case VI was one of carcinoma of the pelvi-rectal junction, rectum and small intestine. A two-stage operation was performed and recovery followed.

CASE VI. G.R., a female patient, aged forty-seven years, had a preliminary colostomy performed. Subsequently perineo-abdominal excision of the pelvic colon and rectum was performed. A coil of ileum implicated in the growth was removed and an end-to-end union was effected. The patient did well for a time, but died after two years with obvious evidence of recurrence of the malady.

Case VII was one of carcinoma of the pelvi-rectal junction and small intestine. A two-stage operation was performed and recovery followed.

CASE VII. S.I., a female patient, aged forty-nine years, had a preliminary colostomy; subsequently perineo-abdominal excision of rectum and pelvic colon was performed. A piece of jejunum was involved in the growth and was removed with the mass, and the continuity of the intestinal tube was restored by means of an end-to-end anastomosis. The patient recovered from the operation, but died in less than two years with obvious signs of recurrence.

Case VIII was one of carcinoma of the iliac colon implicating the small intestine. The growth was extirpated by a modified Paul-Mikulicz technique.

CASE VIII. F.R., aged sixty-seven years, was operated on for subacute intestinal obstruction. A growth of the iliac colon was discovered implicating the small intestine. The colonic growth was mobilized and the whole mass was excised. The continuity of the small intestine was restored by end-to-end union, and the openings of the colon were dealt with as in other exteriorization operations. The patient survived for a year, but no evidence was forthcoming that she died of her original malady.

Case IX was one of carcinoma of the pelvic colon, involving the abdominal wall, two coils of small intestine and the fundus of the urinary bladder. Resection was performed and recovery followed.

CASE IX. G.S., aged sixty years, was operated on and a large mass involving many segments of bowel was removed. The abdominal muscles were extensively infiltrated and the large infected lymphatic gland was present. In each case the continuity of the bowel was restored by end-to-end suture, a temporary caecostomy being performed. The patient recovered and is well nearly eight years later. (Figure V).

Case X was one of carcinoma of the pelvic colon, involving coils of small intestine, the uterus, bladder, left tube and ovary and the abdominal wall. Resection was followed by recovery (Figure VI).

CASE X. G.S., a female patient, aged forty-eight years of age. The whole mass was exsected, the continuity of the bowel being restored by end-to-end suture in each case. A prophylactic caecostomy was performed. The patient recovered from the operation, but showed signs of recurrence in six months' time.

Case XI was one of carcinoma of the iliac colon involving the small intestine and left ureter. Resection was followed by recovery (Figure VII).

CASE XI. S.F., a woman, seventy years of age, was found at operation to have a mass in the left iliac fossa, the removal of which involved the exsection of the iliac colon, a segment of small intestine and a considerable segment of the left ureter. The union of the bowel was in each segment effected by end-to-end suture. The proximal end of the ureter was doubly ligated, and the function of the left kidney suppressed. Despite her years, the patient recovered from the operation, but died in less than a year from heart failure and without any sign of any recurrence of growth.

Case XII was one of resection of a carcinoma of the transverse colon, involving the pyloric segment of the stomach and two coils of small intestine. Recovery occurred (Figure VIII).

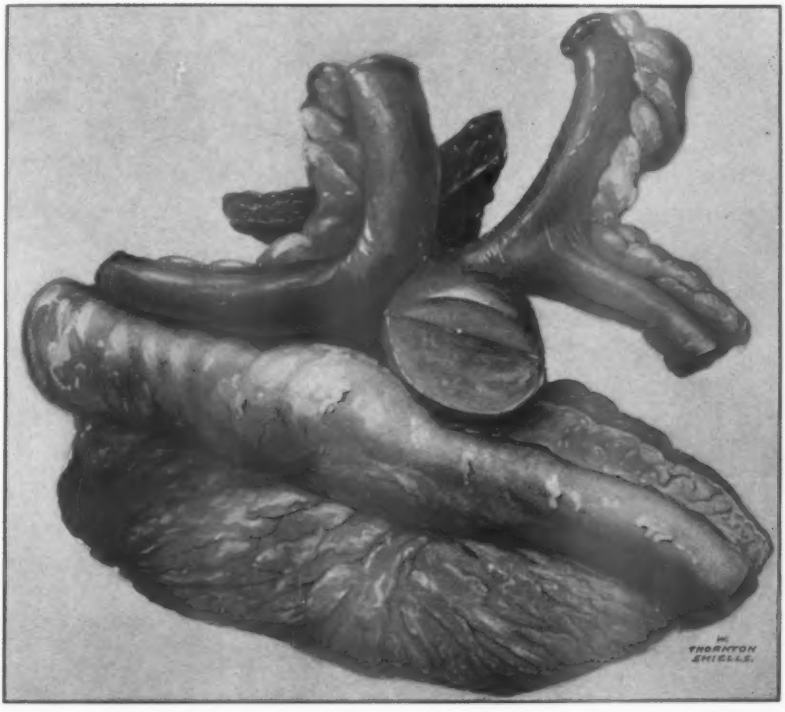

FIGURE V. Case IX. Malignant tumour of pelvic colon, implicating abdominal wall, two coils of small bowel, bladder and infected gland. Patient well seven years later.

FIGURE VI. Case X. Malignant tumour of pelvic colon implicating abdominal wall, three coils of small bowel, uterus and bladder. Recovery, but recurrence took place.

CASE XII. S.G., a female patient, aged thirty-two years, was found to have a large mass, which was ablated. The union of the three intestinal junctions was effected by end-to-end suture. The patient recovered from the operation, but died of her malady in less than a year.

Case XIII was one of carcinoma of the iliac colon involving small intestine. Resection was followed by recovery.

CASE XIII. T.F., a female patient, aged sixty-one years, was subjected to end-to-end anastomosis of the small intestine and exteriorization-resection of the colon. Recovery followed. The patient is still far from well, but only a year has elapsed since the operation (Figure IX).

Case XIV was one of carcinoma of the caecum implicating a coil of small intestine remote from the ileocanal junction. Resection of the right-sided colon was undertaken. Separate enterectomy was performed. Recovery followed.

CASE XIV. Major B., aged sixty-four years, had an end-to-side union of the terminal portion of the ileum to the transverse colon; end-to-end union to the small intestine was also effected. The patient remained well for nearly six years, and then developed a recurrence from which he died.

Case XV was one of carcinoma of the iliac colon involving small intestine and complicated by an extra-intestinal abscess. Drainage of abscess, caecostomy and subsequent resection of mass were undertaken. Recovery followed.

CASE XV. J.N., aged sixty-five years, a female, had an abscess first evacuated and caecostomy was then performed. Six weeks later, after preliminary immunization with a strepto-

FIGURE VII. Case XI. Carcinoma of iliac colon, involving small intestine and ureter. Patient died from other causes one year later.

coccus vaccine and injection of nucleinate of soda, the mass was resected. End-to-end union of small intestine was performed. The large bowel was treated by exteriorization-resection. The patient recovered and is well six years later.

Group 3.

Group 3 includes cases of large intestinal cancer in which some segment of the alimentary canal, for example, the stomach, is involved in the primary growth.

CASE XVI. F.C. had a very advanced cancer of the stomach, involving the transverse colon, which was resected. The patient recovered, but died of a recurrence in his pancreas and abdominal wall two years later.

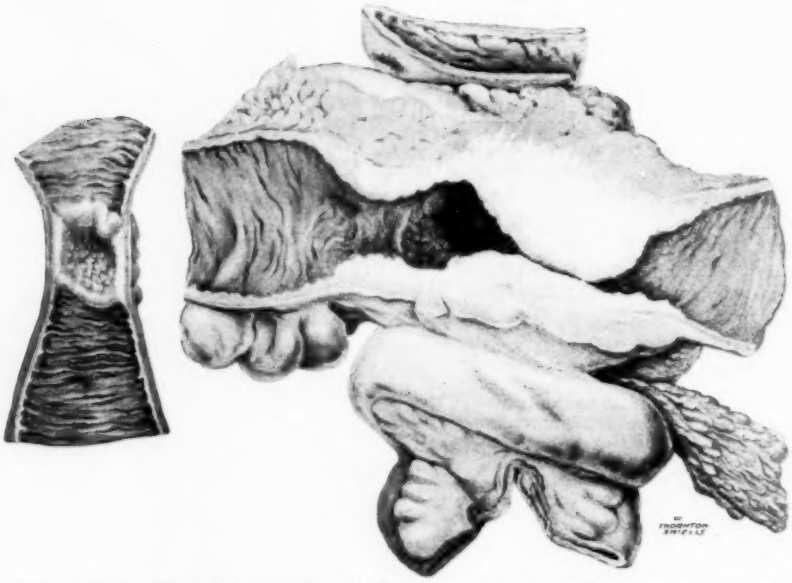

FIGURE VIII. Case XII. Carcinoma of transverse colon, involving pyloric end of stomach and two coils of small intestine. Recurrence in less than one year.

It is of interest that in this case the patient was a builder and was able, in the two years' extended lease of life afforded him by the operation, to amass considerable means and to leave his widow much better provided for than had he succumbed earlier to his malady.

Case XVII was one of carcinoma of the right-sided colon, involving the stomach. A two-stage resection was performed and recovery followed.

CASE XVII. R.H., aged forty-five years, was a fat Jewess, who was operated on in the beginning of 1930. At the first operation an ileo-colostomy was performed, and the ileum was cut across. The stomach was divided on the proximal side of the growth and the cut end of the proximal segment was united to the jejunum.

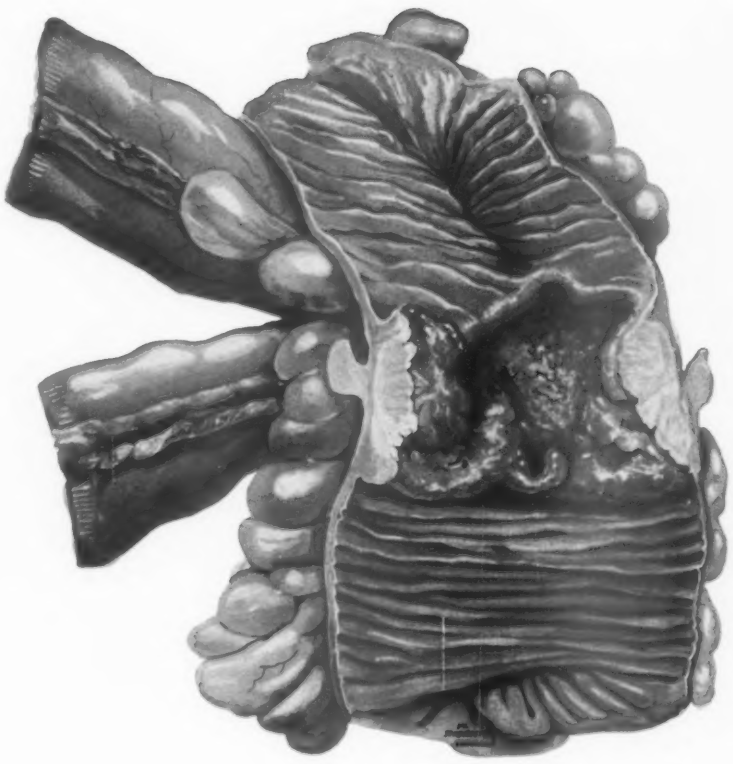

FIGURE IX. Case XIII. Carcinoma of iliac colon involving small bowel. Resection. Patient well one year later.

A second operation was performed a fortnight later, and the mass was removed (Figure X). Fifteen days after operation a fæcal fistula formed, but this closed spontaneously. The patient is in good health nearly six years later. The specimen shows a huge growth of the right colon with a pathological fistula between the caecum and the transverse colon.

Case XVIII was one of sarcoma of the stomach, spleen and splenic flexure of the colon. Operation was performed in 1927 (Figure XI). The patient is alive and well over seven years later, and recently underwent

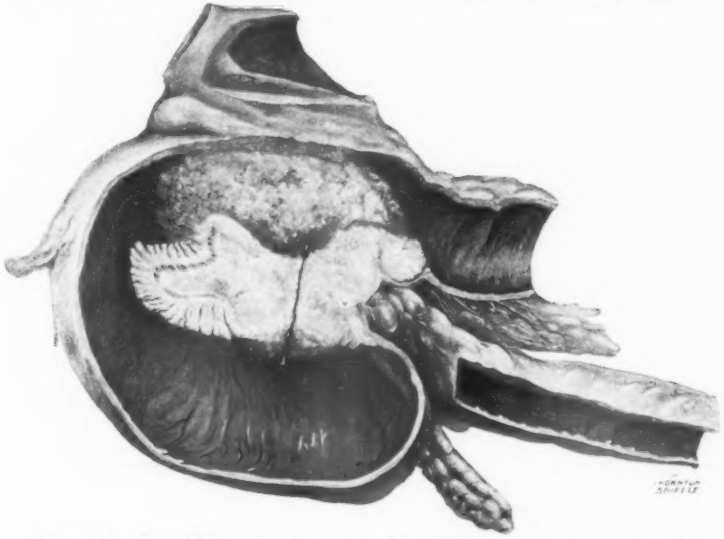

FIGURE X. Case XVII. Carcinoma of right-sided colon involving stomach. Colectomy and gastrectomy. Patient well five years later.

an operation for the termination of a pregnancy, since it was feared that the condition might have a detrimental effect on her health.

Group 4.

Group 4 includes cases of large intestinal cancer in which some solid viscus or hollow viscus unconnected with the alimentary canal is implicated in the growth, for example, bladder, ureter.

CASE XIX. A.F., a male, aged forty-eight years, underwent an excision of a carcinoma of the right-sided colon, involving the abdominal wall and the right lobe of the liver by direct extension. Operation was performed in February, 1930. About one-fifth of the liver was removed with the growth; the gall-bladder was removed with the mass. Recovery followed. The patient is in good health nearly five years later (Figure XII).

Case XX was one of carcinoma of the rectum, involving the uterus and vagina. There was a fistulous communication between the bowel and the posterior vaginal fornix. Two-stage abdomino-perineal excision (rectum, uterus and vagina) was performed.

CASE XX. Sister M., aged forty-eight years, a nun from a London convent, was referred to me in the end of 1929 for a huge ulcerating carcinoma of the ampullary portion of the rectum, which had involved a considerable extent of the posterior vaginal wall and which had perforated the posterior vaginal fornix. The vulva and perineum were constantly bathed in an offensive sanguineous and purulent discharge, which leaked from the bowel and the genital passage, and it appeared obvious that any radical attempt to remove the mass must be preceded by a drainage of the colon.

A left inguinal colostomy was performed, and it was possible at the time of this operation to assure oneself as to the absence of any metastases in the liver and of any involvement of omentum or the pelvic peritoneum. Advantage was also taken of the general anæsthesia to determine the local operability of the huge growth, and to decide also to what extent the genital tract required ablation.

The condition of the rectum, vagina and perineum rapidly improved as a result of the deflection of the fæcal stream, and irrigation of the bowel and of the vagina soon rendered possible the extirpation envisaged. No operative procedure less heroic than an abdomino-perineal excision of the bowel along with the removal of the uterus and vagina seemed likely to rid the patient of her malady, and this method of attack seemed also least likely to produce a severe or possibly a lethal infection. The patient made a good recovery from the operation, and remains well, five years having now elapsed since her operation (Figure XIII).

Although I have performed the combined removal of the rectum, uterus and varying portions of the vagina by the abdomino-perineal method on seven occasions, and although all patients have recovered from the operation, nevertheless this is the only patient of mine who has survived more than two years; the other six have all soon died of recurrence of the malady. Protracted survival after this genito-rectal extirpation has been recorded by F. C. Pybus,[5] by the late W. H. Clayton Greene[6] and by the late S. Maynard Smith.[7] More recently, Mr. Cecil Joll[8] has recorded two cases of the combined operation, in both of which the patients recovered; and in 1933 W. B. Gabriel and Frederick Roques[9] removed a carcinoma of the rectum invading the vagina and uterus by perineal excision and vaginal hysterectomy in continuity; their patient made an uninterrupted recovery, and eight weeks later the perineal wound was almost healed.

Case XXI was one of carcinoma of the rectum, infiltrating the prostate. Abdomino-perineal excision of the rectum and extirpation of the prostate were performed. Recovery followed.

CASE XXI. A.H., aged thirty-five years, was admitted to hospital under my care with a huge carcinoma of the rectum, which had infiltrated his prostate. A single-stage abdomino-perineal excision of the bowel was performed, and the infiltrated prostate, *vesiculæ seminales* and the prostatic urethra were removed with the rectum (Figure XIV). A catheter was introduced into the bladder *per vias naturales*, and the neck of the bladder was attached with no great accuracy and little skill to the proximal end of the membranous urethra. The patient recovered from the operation, but for some weeks a considerable leakage of urine took place.

Providence sometimes kindly interferes on the surgeon's side, and that "Divinity which shapes our ends" would seem on occasion to smile unexpectedly on the efforts of the operator, "rough-hewn" though they may be. The perineal fistula finally healed, and thirteen years later the patient remains well and free from recurrence, despite the fact that much, if not most, of the intervening period of time has been spent within the four walls of various London jails!

FIGURE XI. Case XVIII. Sarcoma of stomach, spleen and splenic flexure removed over seven years ago. Patient well at present time.

FIGURE XII. Case XIX. Carcinoma of hepatic flexure, involving lateral abdominal wall and liver. Excision of mass. Patient alive and well five years later.

FIGURE XIII. Case XX. Carcinoma of rectum involving uterus and vagina. Excision of mass by combined operation. Patient well five years later.

Those who may have seen the late Sir Gerald du Maurier in "Raffles" will remember his conversation with "Bunny": "Money lost, little lost; honour lost, much lost; pluck lost, all lost!" My patient may have lost his rectum and his prostate, but he has not lost his pluck, for he belongs to a band of burglars, and even smiles at the misfortune which so often seems to fetter his activities.

FIGURE XIV. Case XXI. Carcinoma of rectum, involving prostate. Abdomino-perineal excision and prostatectomy. Patient well thirteen years later.

Group 5.

Group 5 includes cases in which multiple resection is necessary, not because of involvement in the primary growth, but because of some complicating, accidental or concomitant condition unconnected with the primary neoplasm.

Case I was a case of septuple resection of the bowel; it is mentioned in the opening pages of this paper (Figures I and II).

Case XXII was one of resection of a fibrous stricture of the jejunum and carcinoma of the descending colon.

CASE XXII. T.R., aged sixty-five years, was referred to me for acute intestinal obstruction. The symptoms and clinical signs suggested that the condition was a small bowel obstruction (Figure XV). On opening the abdomen a tubular stricture of the jejunum was discovered. This was resected and both ends of the bowel above and below the part removed were left on the surface of the abdomen, a Paul tube being inserted in each lumen. The great discrepancy in size between the two ends and the condition of the patient on this occasion seemed to dictate this line of operative treatment.

Three days subsequent to this first operation the wound was again opened to restore the continuity of the bowel, the patient in the meantime having had several intravenous infusions of glucose-saline solution. Restoration of the jejunum was completed, but on investigating the rest of the bowel a carcinoma of the descending colon (Figure XVI) was discovered close to where the jejunal

stricture had been found three days before. There was no distension of the bowel above the colonic growth, which was resected, and an end-to-end anastomosis was performed.

The patient made a good recovery from the operation and remained well for about five years, when he died of apoplexy in his seventieth year.

FIGURE XV. Case XXII. Fibrous stricture of jejunum of tubular character, producing intestinal obstruction.

The resection of two segments of bowel for two consecutive conditions owning a separate pathology is remarkable. The patient may be accounted fortunate in developing his small intestinal obstruction, for in the course of the surgery required to deal with this the malignant neoplasm was detected.

Case XXIII was one of carcinoma of the pyloric end of the stomach. Resection was performed. Subsequent operation was undertaken three months later for carcinoma of the splenic flexure of the colon. Resection was performed and recovery followed.

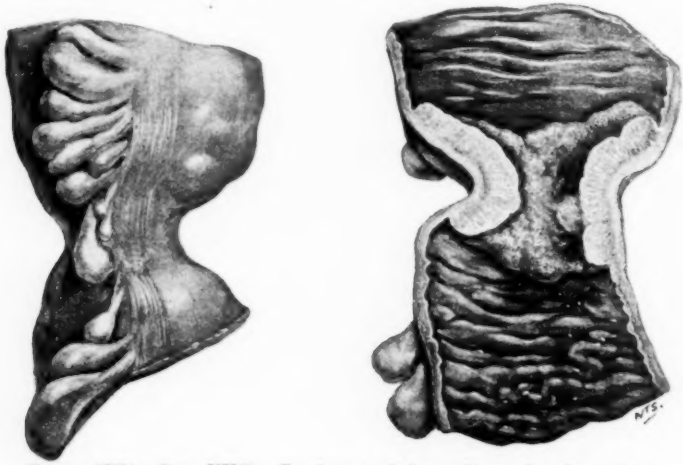

FIGURE XVI. Case XXII. Carcinoma of descending colon from same patient, removed three days later.

CASE XXIII. G.D., aged seventy-four years, was referred to me for symptoms indicative of pyloric stenosis. This diagnosis was confirmed by a barium meal,

and an operation was undertaken. The stenosis proved to be an early carcinoma, which was resected, and the patient made a good immediate recovery.

The operation was performed under local and splanchnic anæsthesia, and no thorough search of the abdomen was made for any other pathological condition. After three months, symptoms suggestive of obstruction again reappeared, and on opening the abdomen a greatly distended caecum was found. With difficulty a small annular growth of a highly placed splenic flexure was identified. Caecostomy was performed, and the growth was subsequently resected. Despite the dual menace of the carcinoma of the pylorus and of the splenic flexure of the colon, the patient has remained well for over three years, and is putting on a considerable amount of weight.

B. RESECTION FOR HOPELESS INVOLVEMENT IN A PELVIC PATHOLOGICAL CONDITION APART FROM CARCINOMA OF THE UTERUS.

Recurrent or chronic infection of the uterus and its adnexa, pyogenic or tuberculous, may necessitate the removal of more than one segment of intestine in the endeavour to extirpate the disease, but the segments of bowel implicated are usually adjacent coils, and a single resection and anastomosis usually suffice. I have recounted elsewhere[1] the case of a lady of thirty-two years (Case XXIV), in whom a multiple resection of small intestine was required to cure a number of small intestinal fistulæ, the aftermath of seven operations by gynæcological and general surgeons. The primary condition underlying the clinical feature was a left-sided tuberculous salpingo-oophoritis. The patient is well seven years later.

C. TUBERCULOSIS.

I have on two occasions performed a double resection for tuberculous hyperplasia of the intestine, and on one occasion a triple resection was done.

Case XXV was one of resection of the right-sided colon for ileo-caecal tuberculosis and of resection of a distant segment of the ileum for tuberculous hyperplasia. Recovery followed.

CASE XXV. Private D. was a Highlander from the Ninth Division, who was operated on at Number 5 Casualty Clearing Station in January, 1918. I heard that all was well two months later in England, but have not traced him.

Case XXVI was one of resection of the right-sided colon for ileo-caecal tuberculosis and of a separate resection of an isolated segment which was the seat of tuberculous hyperplasia, too remote from the caecum to be included in one ablation.

CASE XXVI. The patient was a parson of forty-five years and had a tuberculous hyperplasia. The resection was performed twelve years ago, and the patient is now in good health and actively engaged in his work in the East End of London.

Case XXVII was one of excision of ileo-caecal tuberculosis and of two separate segments of the small intestine for tuberculous hyperplasia. Recovery followed.

CASE XXVII. The patient is a girl who was operated upon in 1923 and who survived a triple resection of the bowel. She is well over eleven years later.

D. NON-TUBERCULOUS GRANULOMA.

Case XXVIII was one of a granulomatous mass involving caecum, transverse colon and jejunum. Triple resection was performed. End-to-end unions were effected. Recovery followed.

CASE XXVIII. W.S., a male patient, aged fifty-seven years, was admitted to the Middlesex Hospital under my care in 1921 for a large mass in the abdomen. This was removed and regarded as malignant until the pathological department reported it as a granuloma. The patient remains well almost fourteen years after his operation.

E. CERTAIN FORMS OF ACUTE INTESTINAL OBSTRUCTION.

Certain forms of acute intestinal obstruction may demand a double resection of the bowel.

Case XXIX was one of acute intestinal obstruction due to knotting. Double resection of the small intestine was performed. Recovery followed.

CASE XXIX. The patient was a young German and desperately ill at the time of operation, which was performed entirely under local anæsthesia. A double resection of the small intestine was found necessary.

According to Kallio,[10] knot formation is one of the rarest forms of intestinal obstruction, and he has been able to collect only 161 cases, of which 75% occurred in Finnish patients. The sigmoid and small intestine are involved in 83% of the cases.

F. MULTIPLE RESECTION OF BOWEL FOR GUNSHOT INJURY.

The War produced a wealth of literature relating to the treatment of gunshot injuries of the bowel. It was recognized by those of us with most experience of these injuries that survival from operation for damaged bowel necessitating double and multiple resection was rare indeed. In 1919 a record of such cases was embodied in a Hunterian lecture given by me at the Royal College of Surgeons of England, and these four cases were published in the columns of *The Lancet* that year.[11] In this description of these cases reliance was placed on the palimpsest of memory, but many of my own records made "in the field" having recently come to hand again, I have had the opportunity of verifying these cases and adding three more to the number. These seven successful cases of double resection are indicated diagrammatically in the attached sketches (Figures XVII to XXIII). In reading these records after many years I have recaptured some of that intense pleasure and pride that was afforded a surgeon by his successes in France and Flanders. It is interesting that the record of one of the cases that I have more recently unearthed concerns an Australian soldier.

G. ANASTOMOTIC ULCERS CONSEQUENT UPON GASTRO-JEJUNOSTOMY.

Anastomotic ulcers consequent upon gastro-jejunostomy demand for their cure complicated resection of jejunum and perhaps of colon as well. The two drawings depicting a gastro-jejunal ulcer and a jejuno-colic

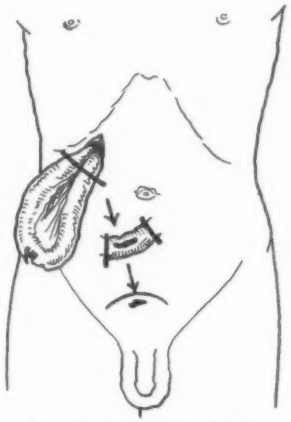

FIGURE XVII. Case XXIX. Private T. Penetrating wound of abdomen: hernia of small bowel: wound of bladder: fracture of anterior portion of iliac crest and pubic bone: double resection of bowel. Recovery.

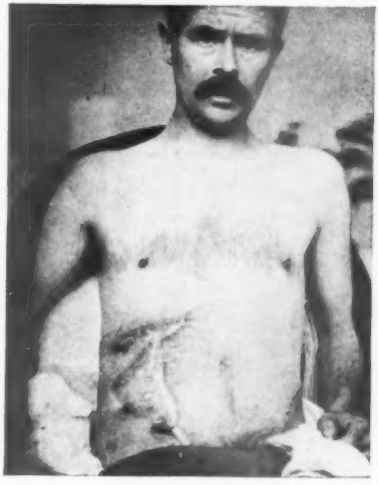

FIGURE XVIIA. Case XXIX. Private T., sixteen years afterwards.

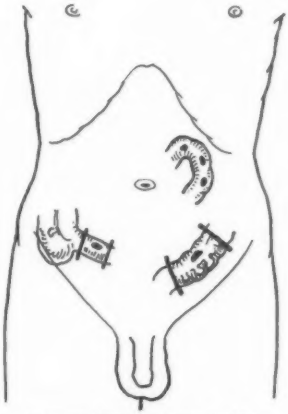

FIGURE XVIII. Case XXX. Private W. Penetrating wound of abdomen: perforation in jejunum sutured: resection of ileum: resection of sigmoid. Recovery.

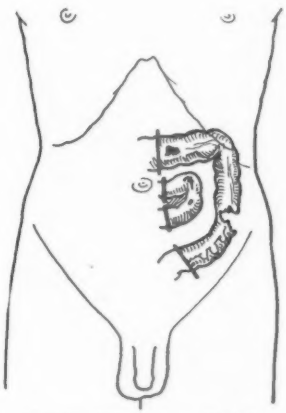

FIGURE XIX. Case XXXI. Lance-Corporal W. Penetrating wound of abdomen: resection of jejunum: resection of distal portion of transverse colon, splenic flexure and descending colon. Recovery.

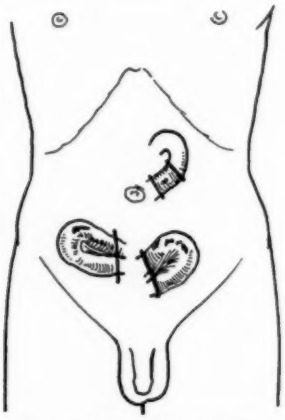

FIGURE XX. Case XXXII. Private O'F. Penetrating wound of abdomen: revolver wound: double resection of small intestine and a perforation sutured. Pulmonary embolism. Empyema. Recovery.

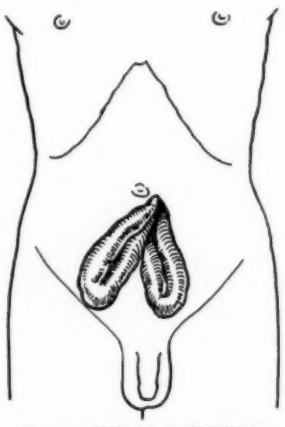

FIGURE XXI. Case XXXIII. Prisoner of war, G. Hernia of two coils of shattered bowel. Double resection. Well when seen one month later at Base Hospital.

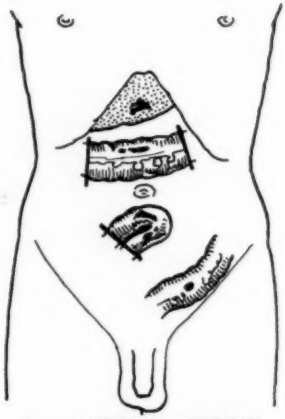

FIGURE XXII. Case XXXIV. Private B., First North. Penetrating wound of left buttock: eight perforations of jejunum and two perforations of sigmoid. Double resection. Recovery.

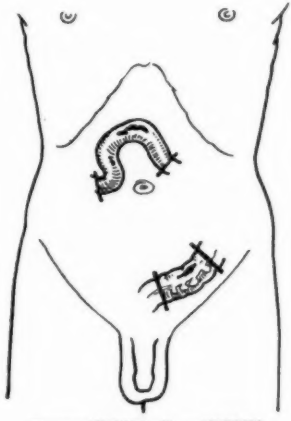

FIGURE XXIII. Case XXXV. Sergeant B., A.A.S.C. Bomb wound. Resection of transverse colon and jejunum. Suture of sigmoid, wounds of liver, forearm and left hip. Recovery.

fistula (Figures XXIV and XXV), indicate the nature of the resections which may be required. My own experience amounts to fifty-four of these cases.

H. UTILITARIAN, RESTORATIVE AND CONSERVATIVE RESECTION OF BOWEL.

Small intestine has been resected with its mesenteric attachments left intact and has been utilized to construct a vagina. The rectum has also been utilized for this purpose, and the sigmoid has likewise been employed. Rock-Carling[12] has given an account in which he secured a brilliant result of this method, and reports that there are at least five other cases in which this particular technique has been followed. I have on two occasions (Cases XXXVI and XXXVII) employed a segment of small intestine to bridge the gap intervening between two pieces of large bowel after a resection for diverticulitis. One of these patients died of a low-grade peritonitis as the result of the operation. The other patient recovered from the operation, but died sixteen months later of a progressive peritonitis due to the same cause.

FIGURE XXIV. Case XXXVI. Specimen showing two gastro-jejunal ulcers. The patient was operated on for severe hæmorrhage in 1923, and has been in excellent health for eleven years.

This method, though successful in the hands of Stephen Fenwick, who first suggested and employed it, and sponsored by Pauchet, is not one that I would again utilize in dealing with diverticulitis.

I. RECURRENT RESECTION.

There is nothing remarkable about recurrent resection. A second resection may be an unexpected sequel of some abdominal operation in which an ablation of intestine has been performed on the first occasion. On the other hand, cases are well known in which malignant disease of the bowel seems to have a habit of reappearing and to be capable of reiterated resection. R. T. Miller[13] records the case of a man of forty-three years who had his rectum removed for carcinoma, and eight years later developed intestinal obstruction: two distinct carcinomata were discovered, one at the hepatic flexure and one in the right part of the transverse colon. They were removed by a single resection.

Dowden[14] operated on a man for a carcinoma of the pelvic colon, for which a resection was performed. Three years later a recurrence in the rectum occurred, for which a colostomy was performed. One year subsequent to the second operation a carcinomatous stricture of the small bowel developed, which was resected. The patient then developed

FIGURE XXV. Case XXXVII. Specimen showing a jejuno-colic fistula. The whole mass removed, end-to-end suture of jejunum and transverse colon, and an ante-colic junction after gastrectomy. Patient well a year later.

a carcinoma at the colostomy opening, and died six years after the first operation.

RECURRENT INTUSSUSCEPTION.

No particular advantage is to be gained by enumerating all the cases of recurrent intussusception due to tumour which finally required resection for a cure. They are recorded by Oughterson.[15] It is sufficient to say that ignorance of the presumptive ætiology leads to failure to cure these cases rather than temporarily to relieve the condition, and results in multiple operations which might have been avoided.

FIGURE XXVI. Case XXXVIII. Photograph of small intestine removed for gangrene from mesenteric vascular occlusion.

RECURRENT VASCULAR OCCLUSION OF THE MESENTERY.

Case XXXVIII was one of recurrent mesenteric vascular occlusion after an interval of ten years. Gastrectomy was performed five years after the first operation.

CASE XXXVIII. N.Y., aged sixty-eight years, a female, was seized with overwhelming abdominal pain in 1922. The degree of agony was almost beyond the power of endurance, and although a diagnosis of a perforation of a peptic ulcer had been made by a well-known physician, the degree of shock from which the patient was suffering precluded any idea of immediate operative interference. Twenty hours had elapsed since the onset of the catastrophe before the condition of the patient made it possible to open the abdomen. Over five feet of infarcted gangrenous intestine were found, and it was apparent that the patient had a mesenteric vascular occlusion. Some seven feet of small intestine were resected, and the continuity of the alimentary canal was restored by an end-to-end anastomosis (Figure XXVI). The elderly lady made a surprising recovery from the operation, and her health remained good for five years.

In 1927 she began to suffer from severe indigestion, and recurrent hæmatemesis led to her admission to hospital, when a large posterior penetrating ulcer was found, and a gastrectomy was performed. The lady,

FIGURE XXVII. Case XXXVIII. Recurrent mesenteric occlusion in same patient ten years later. Death.

who was now seventy-four years of age, again made a good recovery, and her health again remained good for another five years.

In 1932 she was again seized with abdominal pain, somewhat resembling that experienced by her ten years before, but of a milder degree of severity. This was, however, only the precursor of a much more devastating agony, almost unrelieved by morphine, and the diagnosis of a recurrent vascular mesenteric occlusion became obvious.

Operation revealed extensive gangrene of the small bowel, and about five feet of intestine were on this second occasion removed (Figure XXVII). The patient did not survive this second intestinal ablation, living for about four days. The terminal hours suggested a failure of my anastomosis, possibly the result of an extension of the vascular thrombosis, whereby my end-to-end union of the bowel had sloughed.

This case of two separate operations for mesenteric vascular occlusion with an interval of ten years must be remarkable, and the recovery of the old lady from a gastrectomy for a bleeding ulcer of the stomach at seventy-four years of age makes the history still more extraordinary.

CONCLUSIONS.

It is in connexion with multiple resection and complicated operation for bowel cancer that most interest is centred. A computation of the total number of years that would seem to have been added to the lives of these twenty-three complicated cancer cases, recovering from operation, is in the vicinity of a hundred years. Of the eight patients now dead, two seem to have died of causes unconnected with their carcinomata, and it would appear therefore that in the case of cancer of the intestine a bold policy is worth while. It is at least of comfort to the operator to know that he has been the means of prolonging the life of the patient and preserving him to his relatives and friends.

ACKNOWLEDGEMENT.

The illustrations which accompany this paper are from the brush and the pen of my friend, Mr. Thornton Shiells, to whom my best thanks are due.

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HOW SURGERY CAME TO AUSTRALASIA.[1]

By Sir D'Arcy Power,

Consulting Surgeon, Saint Bartholomew's Hospital, London; Honorary Librarian, Royal College of Surgeons of England.

It is not often possible to trace the progress of surgery from the start in a new country. I wish someone would write a novel dealing with the beginning of medicine, surgery and midwifery in Australasia after the same style as Dr. Weir Mitchell wrote "Hugh Wynne—Free Quaker" in 1898, which deals with the beginnings of medicine in America. Such a novel would be intensely interesting and could be founded on fact. Some are still living who have had actual experience of medicine in the early days of the colony. Many have heard from their fathers of what they went through in their youth and middle age, and know the spirit which inspired those pioneers to raise their profession from humble beginnings to the position it now holds.

Surgery came to Australasia pretty equally from England, Scotland and Ireland. Just a hundred years earlier it had reached America almost entirely from Edinburgh. A few American surgeons had come as students under the influence of John Hunter in London, but the great majority of the sons of wealthy and ambitious men graduated from Edinburgh. There alone in the latter half of the eighteenth century was a complete and well equipped medical school provided with teachers who had gained a world wide reputation. By 1855, the year of my own birth, the English and Irish medical schools had become well regulated institutions with traditions and a complete curriculum. The *Medical Act* of 1815 had made compulsory a certain minimum of medical knowledge as tested by examination at the Society of Apothecaries and the Royal College of Surgeons. The *Registration Act* of 1858 made it possible to distinguish the registered practitioner from the quack.

The Beginnings of Surgery in Australasia.

It was far otherwise in Australasia. We read that in 1856:

> No law exists to prevent any person whether educated for the medical profession or not from using any medical title that he may choose or from practising any branch of the healing art that he may find profitable. Ignorance and impudence are the chief acquisitions. Hundreds of mourning friends and relatives can testify to the system of manslaughter which was carried out to so great an extent in the goldfields of the colony. The druggist and the farrier may perform the duties of a physician: the butcher or barber that of the surgeon.

[1] Read at the opening of the Royal Australasian College of Surgeons, March 4, 1935.

You were, in fact, exactly in the position of your English predecessors in the reign of the Tudors, when, as Thomas Gale writes, in 1566:

> I remember when I was in the wars of that most famous prince, King Henry VIII, there was a great rabblement there that took upon them to be surgeons, some were sow-gelders, some were horse-gelders, with tinkers and cobblers. This noble band did such great cures that in two dressings they did commonly make their patient whole and sound so that they felt neither heat nor cold for ever, but did die, and that of small wounds.

Fortunately you were in a new country without traditions, not bound by any charters, warrants or customs of corporate bodies. You did in a single generation what it took us three hundred years to accomplish.

The earliest doctors were army surgeons attached to the regiments quartered here; others came out as surgeons in the emigrant ships. The gold rush increased their numbers and the end of the Crimean War left many young doctors at a loose end. The majority of these young men were of an unsettled type. Most of them had sporting instincts, and some had a love of drink. All were out to make a living, and all were willing to take things as they found them. Landing in Melbourne, they found a settlement of shacks, biscuit boxes and corrugated iron, which was described in 1871 as being filthy, and the sanitation in 1890 as being on a par with that of China and Japan.

A virile race, mostly young, and living in the open air with abundance of food, did not require much surgical assistance, except for accidents, and there would not have been work for a doctor if it had not been for the great scourges of typhoid fever, diphtheria and hydatids, because the ætiology of none of them was then known.

Hygiene had not advanced sufficiently to warn the citizens against depositing crude nightsoil upon the banks of a river whose waters they drank, or from using it in their kitchen gardens. Midwifery, however, was an unfailing rallying point. Every practitioner was an expert obstetrician. His interests lay in that direction, and for many years such original papers as were printed or discussed dealt with the subject. It thrust itself, like King Charles's head, into every debate where two or three doctors were gathered together.

The first book on surgery published in Melbourne was entitled: "Original Contributions to the Practice of Conservative Surgery", by James G. Beaney, M.R.C.S. (Edin.); Melbourne, George Robertson; 1859. It met with a scurvy reception at the hands of the reviewers, one of whom wrote:

> There is not a particle of information to be gleaned from these "Original Contributions" which may not be found in the ordinary textbooks upon the subjects they (the Contributions) profess to discuss. The book—price twelve shillings—is an advertisement setting forth that the author is in want of patients to which his book may haply help him. As a specimen of bookmaking it perhaps deserves credit for being a proof of the extraordinary effrontery which a man claiming to himself the practice of a reputable member of a responsible

profession can exhibit to the world. (*Melbourne Medical Journal*, 1860, Volume v, page 66.)

There is plenty of evidence to show that the medical men in the earlier days were both quarrelsome and aggressive.

It is on record, for instance, that two doctors differed at a consultation about the diagnosis and, at the patient's bedside, the one assaulted the other. They were both brought before the ethical tribunal, and it was pointed out to them that even if one had been guilty of a breach of etiquette, the other should not have punched his colleague's head—at any rate in the patient's bedroom.

Side by side with the doctors were hordes of quacks as impudent as they were ignorant. A *Medical Act* was passed in 1864. It gave some power of control over these pests who "cured by the imposition of hands, by breathing on the skin through a red rag, by friction with magnetized water, and in similar ways". The quacks tried to get on the register by many subterfuges. They forged diplomas and licences from non-existent universities. They even claimed to have the M.D. of Paris, then the most difficult of all M.D. degrees to obtain, but the documents to prove it had been lost on the voyage or had been mislaid and, unhappily, too, they had forgotten every word of their French. "Dr." Vernon stated by his counsel that he ought to be placed on the register because he had practised without let or hindrance for twelve years and, although he had no qualification, he was not in the habit of getting drunk. The defence availed him nothing. He was fined £50 or two months.

It was worse in New South Wales, where there was no machinery at all for dealing with unlicensed practitioners as lately as 1887. Queensland was in a better position than either Victoria or New South Wales. Quacks could be prosecuted there from quite early times.

There were, however, some honourable, sensible and farseeing medical men amongst you even in those early days. They set to work to organize and cleanse the profession, and in 1852 they formed the Medical Society of Victoria. It soon had a list of 68 members, and in 1856 published the first volume of the *Australian Medical Journal*.

PREVISION OF AN AUSTRALIAN COLLEGE OF SURGEONS.

An inspired leading article appeared in the second volume in which the present College of Surgeons was clearly envisaged, though it has taken three-quarters of a century to bring it to fruition. The article says:

It is now a little more than three years since the University of Melbourne was opened by the late Sir Charles Hotham and the first matriculation of pupils took place. We fully agree with those who feel that as there is a University all who can render assistance towards its full development and aid in the attainment of the objects for which it is established should do so cheerfully. Considering it from this point of view we should be glad to see a College of Surgeons and School of Medicine affiliated to it.

We conceive that not only has the time arrived for a School of Medicine to be established, but the necessity also. As to the time, if we wait until

we have a sufficient number of young men ready to present themselves as students in medicine we shall wait in vain. How can we expect persons to seek an object for the attainment of which there are no means? Found the College, appoint the teachers, and the pupils will soon appear. At the present moment there are not a few—we know some—who would rejoice to enrol their names in medical classes, and others whose parents would be happy to send their sons to be educated in the medical profession if there were a school of medicine in Melbourne.

As to the necessity, among the thousands of young men now entering into adult life there are no doubt some who desire to embrace the profession of medicine, but the expenses of the voyage to and from Europe, of a residence of at least three years where they should prosecute their studies, and of college and class fees render the outlay too heavy. The parents or guardians of others whose affluence would easily admit of this heavy outlay, very probably dread the danger (moral as well as physical) of sending their sons so far away and for a period so protracted at a time of life also when, if unprotected by friends and family, or unrestrained by wholesome control, they would become easy victims to the seductions of a gay metropolis.

We have reason to believe that there are in various localities throughout the colony persons practising medicine who have completed the curriculum of medical education required by British colleges, but who have not passed their final examination and obtained their diploma or degree. To these the benefit of a College of Surgeons would be paramount, giving them the opportunity of becoming by examination legalized practitioners.

Lastly, it would be well to have a College of Surgeons established before other and conflicting interests should arise or monopolies come into existence which might in a few years hence render the establishment of such a College or its affiliation to the University a matter of considerable difficulty.

A medical school in connexion with the University of Melbourne was opened on May 1, 1866, though Professor Halford had given an inaugural lecture on May 15, 1863. The theoretical part of medical education seems to have been well taught, and the examination questions, which were regularly published, were of a searching character. The method of election to the staff at the Melbourne Hospital, however, prevented the professor of surgery from having the care of beds. He was, therefore, in the same position as was Lister about the same time at the University of Glasgow. The clinical teaching of surgery suffered accordingly. There were no dressers, there were no clinical lectures, and there was no systematized bedside teaching. The teaching of practical anatomy too was difficult, for it was almost impossible in a small community to obtain subjects.

Medical Societies.

The Port Phillip Medical Association was founded with six members in 1846. It was one of those book clubs which were also greatly favoured in England at about the same period. The subscription was spent in books, which were circulated during the year and raffled for at Christmas.

The association seemed to have lasted until 1865, when the suppers had become too elaborate for individuals, and the meetings were taking place at the Prince of Wales Hotel. The circle was enlarged, and the Victoria Medical Association was brought into existence in 1852, together with a select Medical Chirurgical Society of Victoria, which in the same

year numbered eighteen members. The three little clubs united in the following year (1853) to form the Medical Society of Victoria, which mustered sixty-four strong in 1863.

EARLY SURGEONS.

There was no special class of pure consultants, even as late as 1887, such as you now have, or as we had been long accustomed to in London. Every man was more or less a general practitioner, and each one in turn might be called into consultation in any department of medicine, surgery or midwifery. Your largest cities were not so large but that every man's practice overlapped every other man's and all came into a kind of competition. There was, moreover, a freedom of intercourse, a circulation of news and a canvass and criticism of medical work and professional men such as was impossible in the larger and less democratic cities of Great Britain.

Of the sixty-two members of the Victorian Medical Society in 1870 two were M.D. of Edinburgh; three M.D. of Glasgow; three M.D. of St. Andrews; fourteen M.D. of Melbourne; one M.D. of Maryland, United States of America; one M.D. of Giessen; one M.D. of Würzburg; one M.D. of Marburg; one M.D. of Erlangen; one M.B. of London; two M.B. of Melbourne; one M.B. of Sydney; four F.R.C.S. England; one F.R.C.S. Edinburgh; and twenty-six M.R.C.S.—a very fairly representative assembly.

The first F.R.C.S. England to settle in Australia was Edward Samuel Pickard Bedford, who died in 1875. He qualified M.R.C.S. on March 15, 1823, and was admitted a Fellow on April 19, 1854. He is said to have been educated at the Colonial Hospital, Hobart, at King's College and at Guy's Hospital. He practised in Tasmania, where he was a member of the Medical Board, and afterwards in Sydney, becoming Medical Advisor to the Government and President of the Board of Visitors to the Lunatic Asylum.

The major operations in Victoria were undertaken by a Welshman, three Englishmen, an Irishman and a Scotsman, to take them in the order of their seniority. All were interesting personalities, and their services to colonial surgery should be mentioned.

The Welshman was John Davies Thomas. He was born at Llwyn-y-Berlian, Carmarthenshire, in 1813, and was trained at the Swansea Infirmary, afterwards at University College London. Here he came under the direct influence of Robert Liston. In 1839 Thomas settled in Melbourne, and died in 1871, having spent his later years at Adelaide studying the life history of hydatids, and had extended his name to J. Davies Thomas.

The senior of the three Englishmen was Edward Barker, born in 1818. He was educated, like Thomas, at University College, where he acted as house surgeon, and was admitted M.R.C.S. in 1839. He too must have been influenced by the example and fame of Robert Liston, but his interests lay rather in the direction of operative midwifery, which in the end proved his downfall. He died in 1885.

Tharp Mountain Girdlestone was born in 1823. He was educated at Saint Bartholomew's Hospital, where he was house surgeon when Sir James Paget was warden of the Residential College, Lawrence and Stanley being the surgeons. He was the best known in England of all the surgical profession in Melbourne because he introduced kangaroo tendon for ligatures, showing the first examples, the result of his own curing, at a meeting of the Victoria Medical Society on December 5, 1887. He died in England in 1899.

The third Englishman was James Thomas Rudall, born in 1828. He qualified M.R.C.S. in England in 1854, after an education at Saint Thomas's Hospital. He became an assistant surgeon in the Royal Navy, and sailed in Her Majesty's ship *Talbot* on one of the last expeditions in search of Sir John Franklin. He resigned his commission on the return of the expedition, was elected F.R.C.S. England, and arrived in Melbourne in 1858. He soon obtained a good surgical practice, and was somewhat of a specialist in diseases of the eye, nose and throat. He died in 1907.

Samuel Athanasius Cusack was born in Dublin in 1830, and brought with him the great tradition of Irish surgery. He received his medical education at Steevens Hospital, Dublin. A year or two in the unhealthy atmosphere of the Dublin dissecting rooms undermined his health. He came to London, took the M.R.C.S., having already qualified at home, and was gazetted surgeon to the fifty-fourth regiment of foot in 1854. Ultimately he came to New Zealand, where he was appointed surgeon to the Colonial Hospital at Nelson. He reported from there in 1866 a case of excision of the hip, the removal of an enchondroma from the tibia and the ligature of the femoral artery for traumatic aneurysm. Ill health, however, pursued him. He moved to Melbourne, and then to Maitland, New South Wales, where he died on February 9, 1869.

Paul Howard MacGillivray, F.R.S., LL.B. Aberdeen, was born in 1834, the son of Dr. William MacGillivray, Professor of Natural History in Marischal College, Aberdeen, and the author of a well known history of British birds. He took the M.R.C.S. in 1855 and arrived in Victoria in 1862. He was appointed surgeon to the hospital at Sandhurst, near Bendigo, and began to study the fossil Polyzoa of South Australia and the Polyzoa of Victoria. His friends looked upon him at first as a mere naturalist. To their surprise he developed an unexpected talent for operative work, specialized in surgery, made a great reputation throughout the colony, and died of erysipelas on July 9, 1895.

Arthur Martin À Beckett was the first Fellow of the Royal College of Surgeons of England to settle in New South Wales. He claimed direct descent from the father of Saint Thomas à Beckett, the Archbishop, murdered in Canterbury Cathedral in 1170. Born in 1832, Martin À Beckett was educated at what is now University College Hospital in London. He took his M.R.C.S. England in 1838, so he too must have been influenced by the example of Robert Liston, who had then recently come down from Edinburgh. Martin À Beckett served

with the British Army in Spain, and arrived in Sydney in June, 1839. Here he lived for thirty years, and was appointed surgeon to the Benevolent Asylum, a member of the Legislative Council of New South Wales, and an examiner in the medical faculty of the University of Sydney. He was elected a Fellow of the Royal College of Surgeons of England in 1855, and died in 1871. New South Wales was fortunate in obtaining the lifelong services of such a man. In a new country his example must have been of incalculable value to the medical profession.

Charles Nathan was the second F.R.C.S. in New South Wales. Born in 1807, he was elected F.R.C.S. in 1857. He began to practise in Sydney in 1842, and was surgeon to the Sydney Infirmary. For many years he had the chief surgical practice in New South Wales, though he was examiner in medicine in the University. He died in 1872.

There are many others well deserving of commemoration did time permit, for in each colony there was a wholesome leaven to combat the noisome growth of charlatanism which was ready to choke legitimate medical practice. And this leaven for good has led to the splendid position you now hold in the eyes of the world.

In New Zealand, for instance, Edward Hulme brought with him the teaching of Sir Charles Bell from the Middlesex Hospital, of Astley Cooper from Guy's, of Robert Liston from University College, and of Velpeau from Paris. I could tell you of Professor G. B. Halford, of John Williams, F.R.C.S., of William Smith (Demonstrator of Anatomy in Sydney), of Dr. F. C. Batchelor, of Professor Stirling of Adelaide, and of Dr. Margaret Amelia Corliss.

OPERATIONS.

The operations undertaken during the early period were, of course, representative of those which were not unusual in London, in Edinburgh and in Dublin. They were for the most part successful. The city was not densely populated and the hospital was not overcrowded. They were not attended, therefore, by the disastrous results which followed some years later when the hospital and staff in attendance became thoroughly septic.

Aneurysm.

Aneurysm was very common, the result of insufficiently treated syphilis and the hard manual labour required of the early settlers. Every medical practitioner had plenty of experience in treating aneurysm, and the records are full of the different methods used to cure it. Many ligatured the artery in its continuity (Hunter's operation) and were dissatisfied with the results. Secondary hæmorrhage occurred when the septic ligature came away on the seventh to the tenth day, and the patient too often died because the wardsmen who acted as nurses were grossly ignorant. Sometimes the operation was bungled, gangrene followed and the subsequent high amputation too often meant death. Nevertheless a few surgeons were bold enough to tie the sub-

clavian and the common iliac arteries. Others dispensed with operation, using Luther Holden's method of digital compression, or the flexion of the limb recommended by Ernest Hart.

Stone.

Victoria was the stone country in the earlier years of the colony. I do not know if it now holds that unenviable reputation. The treatment of stone was always a joy to the older generation of surgeons. They undertook lateral lithotomy, the final test of an operating surgeon in preanæsthetic days, with joy and pride, emulating in speed and dexterity what they had watched their masters do in London, in Edinburgh and in Dublin.

Lithotrity was greatly improved by Sir Henry Thompson at University College, London, about 1870, but as early as 1866 Girdlestone was using it, and it gradually displaced the old operation of lithotomy. Lithotrity lost favour in due time just as the lateral operation had fallen into disuse. It was replaced by removal of the stone from the kidney and by a suprapubic operation from the bladder.

Hernia.

Hernia was very common, more especially amongst the stockmen. Reducible hernia was treated with some kind of bandage, for there was no skilled truss maker at the time, though Frederick Lowe Jeffcoat was making surgical instruments at Otago between 1850 and 1860.

A few patients were subjected to the radical operation. Professor John Wood's method appears to have been generally used, although it required such a sound knowledge of anatomy that it was said only to be understood by Johnnie himself. The older surgeons, however, had been brought up in the dissecting rooms of their own medical schools in Great Britain, so occasionally they may have been successful.

Strangulated hernia was of necessity operated upon when prolonged taxis, warm baths and opium had failed. For some obscure reason it was customary to puncture the swelling with a trocar and cannula to draw off the fluid in the sac before making an incision. Operation, as in England, was the last resort, and, as in England, there were two schools—the one taught that the sac should not be opened, the other that reduction should not be attempted until the bowel had been exposed. In either case he was a proud man whose patient recovered and he would publish even a single successful case.

Cancer.

Cancer seems to have been by no means common. There are a few records of amputation of the breast, although there are a good many of cancer of the tongue.

Bones and Joints.

Tuberculous disease of the bones and joints was rife and, as in England, was badly treated. The value of rest in the early stages

was neither understood nor practised. A child with hip disease was allowed either to go about without any apparatus or was put into a Thomas splint without supervision, for there was no skilled nursing. Amyloid disease and death from exhaustion were the usual endings, but so they were with us, as I well remember.

Excision was in favour from quite early times. Edward Barker and William Gilbee both recorded successful operations for removal of the upper jaw and mandible.

Fitzgerald, in his inaugural address in surgery at the first Australian Congress in 1887, states—but, I am told, quite untruly—that there was an almost entire absence of rickets, and there were few deformities due to that disease. He says:

> That if the whole of our colony were searched not five cases of *genu valgum* suitable for operation would be found. The Australian child is straight-limbed and level-featured; a neglected club foot may possibly be met with, and occasionally one runs across a "boiteaux" from chronic hip disease, but rickets and bone distorsions arising from other causes than fracture are almost unknown.

Amputation.

Amputation was perhaps the most common capital operation. Severe injuries were numerous, and it was safer at a time when suppuration was encouraged to remove a limb than to try the effects of conservative surgery. A return from the Melbourne Hospital in 1862 shows that there had been 14 amputations and three deaths. At Bendigo, in 1870 to 1871, there were 80 operations and 26 were amputations. The report does not state the results.

Hydatids.

Hydatid disease was increasing because its method of propagation was not yet understood. D. J. Davies Thomas of Adelaide, who devoted much of his later life to its study, wrote in 1865:

> Many persons suffer to a fearful degree from a parasitic disease—hydatids. It is very frequently fatal from the enormous size it sometimes attains and from several of these formations existing in some vital organ. I need hardly tell you that the larvæ are produced from the eggs of a tape-worm which finds its way into the stomach with the food and is taken directly into the circulation through the openings of the vessels in the intestinal canal. Many of those in the liver and abdomen are cured by introducing a small trocar and evacuating the fluid. This, however, often requires repeating. In order to check the extension of this parasite endeavours should be made to find out from what tape-worm the *Echinococcus hominis* springs and what animal is the medium of propagation. If this and other means be neglected, hydatids will soon be as common here as in Iceland. We are scarcely ever without a case of the kind in the hospital.

The forecast proved correct, but it was not until 1888 that Dr. Gordon Macdonald, of the Dunedin Hospital, gave a full account of the life history of *Tænia echinococcus*, with an excellent coloured plate, in *The New Zealand Medical Journal*, Volume ii, 1887-1888, pages 80 and 142.

Intussusception.

Intussusception was frequent, to judge by the number of cases which were published from 1863 onwards. They nearly always ended in death of the baby, which is not surprising when, as in one case, the treatment consisted in a dose of calomel, an emetic and an injection followed by "a good dose of castor oil". The practitioner who reports the case seems to have been surprised that death took place sixteen hours after the onset of symptoms. You had, indeed, great need for the teaching and example of Dr. C. P. B. Clubbe in Sydney, who published seven cases of laparotomy in September, 1895, and strongly advocated immediate operation.

Appendicitis.

Appendicitis as we now know it was not uncommon. The two following cases show the method of treatment and how narrowly Victoria escaped the credit of having the first surgeon to operate deliberately for its relief. Here is the old method. It is reported in the *Melbourne Medical Journal* for 1865, and the patient recovered in spite of the treatment. It appears under the heading of "Occasional Communications". It is worth while reproducing because there are very few detailed descriptions of the symptoms and treatment of appendicitis when it was still called typhlitis or perityphlitis. The account too is very graphic.

"On a case of intestinal obstruction treated by chloroform." Dr. J. Davies Thomas, then surgeon to the Melbourne Hospital, says that he was summoned to a brother practitioner who, on December 12, 1864, had ridden 50 or 60 miles on the hot summer day of December 5. He felt tired when he got home, but ate a late dinner and afterwards lay down in the verandah and fell sound asleep. He awoke with a severe pain in his bowels, and for its relief took a dose of tincture of rhubarb. The pain continued all through the night and during the next day. He tried every means to relieve it and to get an action of the bowels, but without success. The attacks of pain became more frequent and he had very little sleep.

He sent for Dr. Nicholson on December 7 because he had begun to vomit. The vomiting continued throughout the next day (December 8), the pain became worse, the bowels were still unrelieved. On December 9 he began to hiccup. The vomiting increased on the tenth and towards the evening the vomit was fæcal. The patient had been given warm baths and fomentations, sedatives, antispasmodic laxatives and repeated enemata; neither food, medicine nor drink would remain on his stomach.

Dr. Thomas saw him between 8 and 9 on the evening of December 12, just a week after the beginning of the illness. He found that there was tenderness all over the abdomen. Pressure caused considerable pain over a circumscribed space in the right hypochondriac region, and this led Dr. Thomas to suppose that the obstruction was in the ascending colon. None of the injections hitherto administered could be retained for a minute.

Dr. Thomas then goes on to say: "I first ordered an injection of turpentine, castor oil and gruel. Violent pain and tenesmus occurred when little more than half a pint had been thrown into the bowel and, as before, the injection could not be retained. I now ordered half a drachm of calomel as a sedative to delay the hiccough and vomiting for a time at least. This, the patient thought, would settle him, but as he believed that he had no chance of recovery he consented to take it. The large dose of calomel very soon temporarily checked the

hiccoughing and vomiting. I told him I intended to administer chloroform. This startled him; he thought half a drachm of calomel in his weak state rather a dangerous dose, but the inhalation of chloroform he was sure would annihilate him altogether, but, as he was in my hands, he would abide by my orders and die *secundum artem*. I administered the chloroform by means of a handkerchief, and carried it to the fullest extent; there was no sign of life left except the abdominal respirations and a very small pulse at the wrist. When in this state an injection of salt water and turpentine was thrown up the bowel to the extent of three pints. He was then covered up and remained apparently asleep for twenty minutes. Slight vomiting then came on which roused him. He had no idea that an injection had been administered, but in a short time afterwards he felt inclined to have a motion. He was got on the night stool and nothing whatever passed but the injection. In a few minutes after he had returned to bed he passed some flatus. This made me more hopeful. He then vomited slightly, and the contents ejected bore the odour of turpentine. This, together with the improved expression and absence of hiccough and almost total disappearance of vomiting, made me more sanguine and enabled me to speak in a much more encouraging tone to my patient, which seemed to do him good. I now gave him some hot brandy and water, which, to his astonishment, remained quietly on his stomach. Shortly after this he had a feeling as if he were about to have a natural evacuation. He got on the night stool and passed a moderate quantity (about a tablespoonful) of liquid fæcal matter. I ordered him a little weak beef tea and went to bed (this was about 3 a.m.), as there was now nothing more to be done. I got up at 9 and found that he had slept, had had four more evacuations and felt comparatively comfortable. I ordered him to take a small dose of granular citrate of magnesia every morning and a tincture of infusion of gentian three times a day. Henbane at night, if required. Beef tea once a day, either sago, maizena or arrowroot three times a day, and a tablespoonful of brandy in a wineglassful of water four times a day.

"He was confined to bed for a week. He took a holiday for a month, being half the time I recommended him, at which time he felt tolerably well, but still had an uncomfortable feeling in his right hypochondriac region. His system was severely shaken, and it was many months before he was restored to his usual health."

Dr. Thomas adds: "It has been my practice for a great many years to administer a large dose of calomel (I have given as much as a drachm) in cases of violent colic attended with vomiting and constipation, and, as a rule, I have found it capable of checking the urgent symptoms and, I believe, of completely arresting the progress of the disease. It is my opinion that many cases of constipation arise in the first instance from spasm, which, if not checked, goes on to inflammation, producing thickening and condensation of a portion of the intestine and thus renders it impermeable and liable to intussusception.

"The chloroform, in my opinion, destroyed the irritability in the intestinal canal. It removed any spasms that might have existed, and thus rendered the intestine in a state fit to retain a copious injection. It may, in this case, have reduced the powers of life to so low an ebb that the small blood vessels became relaxed and the blood was thus allowed gradually to subside in the hyperæmic portion of the canal. In inflammation of a portion of the intestine the principal action very frequently goes on in the serous coat, and since the colon is not entirely surrounded by the peritoneal covering, the whole calibre of the tube possibly may not have been involved."

It appears from this that appendicitis was common in the neighbourhood of Melbourne, and that the patients for the most part recovered, as otherwise a *post mortem* examination must have revealed the error of Dr. Thomas's reasoning and how near he got to the real explanation.

You will remember that the first operation for appendicitis as appendicitis was done at Guy's Hosiptal by Mr. Charters J. Symonds at the instigation of Dr. F. A. Mahomed in July, 1883. Treves published his work on intestinal surgery in 1885, and undertook the deliberate removal of a recurrent inflamed appendix on February 16, 1887, though he did not publish the case until February 14, 1888. These dates will remind you how near Melbourne could have come to claim priority for the operation if Dr. Webb had been fortunate enough to meet a fourth case of acute appendicitis in 1884.

In that year on October 1 he read "Notes on Three Cases of Perforation of the Vermiform Appendix", by J. H. Webb, M.R.C.S. (Eng.), L.R.C.P. (Lond.) (*Melbourne Medical Journal*, 1884, Volume i, New Series, pages 436 to 443). He says:

> The cases happened within the last five years and occurred wholly in my private practice. The first patient was a girl of 15, and she died; the second patient was also a girl, rather older, she died also; the third patient was a middle aged man, who died.

Mr. Webb then goes on say that he believes lesions of the vermiform appendix to be commoner than is generally supposed. Drugs are useless, but patients should not be left to die.

> The mind once made up (our fault is to wait too long) immediate action should take place. I certainly would advise abdominal section, and if I ever have such another case go through my hands I shall open the abdomen, say "Nay, who will". The operation will at least give a chance. This may appear heroic and fantastic surgery, but surgery is only for those who have boldness to accomplish. Let those who cavil remember that more lives are lost through faint heartedness than ever are sacrificed through abuse of the scalpel.

Brave words, and it is a great pity that he does not appear to have had an opportunity to carry them into action.

Listerian Surgery.

Lister's campaign against wound infection and hospital gangrene began, says Sir Rickman Godlee, on August 17, 1865. The methods he adopted were published in *The Lancet* in a series of articles beginning on March 16, 1867, though it was not until April, 1875, that germs were recognized as a cause of suppuration, nor until 1878 that Littré invented the convenient word "microbe" to designate them. The first rumblings of this coming revolution in surgery must have reached Australasia very quickly. Mr. William Gilbee, surgeon to the Melbourne Hospital, wrote a short paper on December 4, 1867, "On the Treatment of Abscess and Compound Fracture by Mr. Lister's New Method" (*Melbourne Medical Journal*, 1868, Volume xiii, pages 20 to 24). He says that he had been assisted in its preparation by his resident surgeon, Dr. Maunsell. It marks a definite epoch in Australian surgery and is, therefore, of historical value.

> Case I was that of Mary Gregory, aged eleven years, who had a large cold abscess which extended from an inch above the left great trochanter to about the centre of the thigh. It was associated with spontaneous dislocation of the

hip, evidently the result of tuberculous disease. A solution of one part of carbolic acid in four parts of boiled linseed oil was prepared. A piece of rag six inches square was dipped into the mixture and laid on to the skin where the incision was to be made. The lower end of the rag being then raised, a scalpel dipped in the oil was plunged into the cavity of the abscess, and the instant the knife was withdrawn the rag was dropped upon the skin as an antiseptic curtain, beneath which the pus flowed out into a vessel placed to receive it.

The cavity of the abscess was firmly pressed so as to force out all existing pus, and about twenty ounces were evacuated. A piece of lint dipped in the antiseptic oil was introduced into the incision to check bleeding and to prevent the primary adhesion which might otherwise have occurred. One ounce of pus escaped the next day when the plug was removed under cover of the antiseptic rag and firm pressure was applied. The discharge did not exceed two drachms in the next two days. On the fourth day the abscess had contracted and the wound was entirely healed. There was a perfect absence of all constitutional disturbance during this period; the tongue was clean, the pulse normal, the appetite good and she slept well. A long splint was applied.

Case II. Mary Downer, aged 46, was admitted on the 23rd November, 1867, under the care of Mr. Garrard. She had a fracture of the internal malleolus and a compound dislocation outwards of the lower end of the fibula. Mr. Garrard removed with a saw the lower end of the fibula, which was protruding through the skin, and he immediately dressed the wound according to Mr. Lister's method. It was then well strapped and bandaged and placed upon a McIntyre's splint which had been given to her. The dressings were removed on December 2nd, that is to say, nine days later, when the wound looked healthy and had discharged about half an ounce of pus mixed with serum. It was redressed according to Mr. Lister's method. Two days later, on December 4th, it was redressed again. The wound looked well and had discharged about an ounce of serum with merely a trace of pus.

Mr. Gilbee ends his communication with the words:

The results of these two cases are of a kind to assure me that further trials of this mode of treatment will produce equally encouraging effects, and I shall take occasion to report to the [Medical] Society [of Victoria] any further experience I may have of it.

The good results obtained by Mr. Gilbee were confirmed a few months later by Mr. J. Rutherford Ryley, M.R.C.S. Edinburgh, Surgeon Superintendent of the Hospital and Surgeon to the Gaol and Lunatic Asylum, County of Westland, New Zealand. Mr. Ryley headed his contribution, "On the Surgical Use of Carbolic Acid" (*Melbourne Medical Journal*, 1868, Volume xiii, pages 107 to 113), and dates it from the Hospital Reserve, Hokitika, February 4, 1868.

On January 14, 1869, J. D. Thomas, M.D., F.R.C.S., surgeon to the Melbourne Hospital, records a case of excision of the elbow joint in a woman, aged twenty-three. The after-treatment consisted in the application of carbolic acid lotion.

On May 7, 1869, Dr. E. Hogarth Pringle, writing from Parramatta, New South Wales, made "a report of surgical cases illustrating the advantage of the use of carbolic acid in compound fractures, etc.":

I have not thought it necessary to give all the minute details of each case, nor have these cases been produced as exceptions, for I have never had a failure where pure acid and careful management have been employed.

Dr. MacGillivray, on the other hand, was less successful, and perhaps more truthful, at Bendigo, where he used a dressing of carbolic

acid and glycerine (one part in three) for a patient suffering from compound dislocation of the ankle.

It is clear, therefore, that the surgeons in Australasia gave a fair trial to these early essays in antiseptic principles. They were hampered by the absence of any bacteriological laboratory, by the inability to obtain the dressings of absorbent wool, hat lining and gauze recommended by Lister, and by want of a scientific training which alone could enable them fully to understand his teaching. At any rate, the Australasian surgeons showed a more open mind than their colleagues in Great Britain, but the results did not justify expectations. The majority preferred to continue on the old lines, and for more than a year nothing more was published on the value of carbolic acid dressings.

In 1872, Mr. W. H. Jenkins, M.R.C.S., assistant surgeon to Her Majesty's Fourteenth and Eighty-fourth Regiments, late resident surgeon at the Hamilton Hospital, wrote "On Some Recent Improvements in Surgery" (*Melbourne Medical Journal*, 1872, Volume xvii, page 40). He gives a clear account of an operation he had seen at the Rutland and Stamford Infirmary in England performed by Dr. Newman under carbolic spray and the subsequent dressing with gauze. Newman was an early disciple of Lister, and had learnt his practice from the master himself. Surgeon Jenkins concludes his article by saying:

> On my arrival in Melbourne by the *Asia* at the end of last year [1871], I was much surprised to find that these preparations of antiseptic gauze and macintosh prepared with oiled silk were not to be obtained.

He gave a demonstration of the antiseptic dressings he used which the reporter says was "new to all". As a result of this demonstration, on January 15, 1872, Mr. Gilbee successfully amputated below the knee under carbolic spray.

Melbourne Hospital.

The Melbourne Hospital rather retarded than accelerated the progress of surgery in the city. Founded in the early days of the colony, and incorporated in 1865, it retained some of the characters of the older European hospitals. Like them, it was supported by subscribers who paid a guinea a year and were entitled to a vote in the election of the staff; unlike them, the honorary staff was elected every four years. There was, therefore, no fixity of tenure, and as a place on the staff was eagerly sought for, abuses crept in. Votes were made, canvassing on a large scale was undertaken, and when there were 4,000 electors, of whom some 1,500 recorded their votes, the expense was serious. It happened, therefore, from time to time that the best choice was not always made, and surgery in the hospital was sometimes of no very high order. The clinical teaching too suffered. There was no medical school attached to the University of Melbourne as late as 1861, and when medical education was undertaken by the University in 1863 no provision was made to enable a professor of surgery to have charge of beds in the hospital. He was dependent, therefore, upon the surgeons

of the Melbourne Hospital for clinical teaching, and he was thus, as I have said, in the same position as was Lister himself when he was appointed Regius Professor of Surgery at Glasgow. Some of the surgeons at the Melbourne Hospital were unable to lecture, some neglected their duty in the wards, and some were constitutionally unfitted to teach. Clinical surgery, therefore, was at a discount for many years. There was no system of apprenticeship nor, outside the town, of partnership. Many students went into practice directly they had graduated and often into remote districts—a system which was good neither for themselves nor their patients.

The Melbourne Hospital soon became too small for the needs of the city, although the Alfred Hospital had been founded and took off some of the pressure upon the beds. Overcrowding took place, sanitary precautions were neglected and hospitalism was rampant. Of five people operated upon in one day in 1885, four died of pyæmia, which is not surprising when the same note adds that "one of the surgeons went straight into the surgical ward after making a *post mortem* examination on a case of pyæmia" (*Australian Medical Journal*, 1885, Volume vii, page 567).

CONCLUSION.

There is much more I could tell you. Of the early days of the University; of the struggles of the ladies, first to get taught at all, afterwards to graduate and finally to be admitted members of the Medical Society. Of the time when doctors were content to diagnose "death from apoplexy" when young men died suddenly and no *post mortem* examination would be made. Of a time when it had to be explained in answer to a correspondent that "chloroform is not synonymous with chlorophyll, for the former is the well-known therapeutic agent and the latter is the green colouring matter of leaves". Of a time when an account could be rendered, "to removing forty feet of tapeworm at 6d. per foot, £1". Of a time when the library of the chief medical society was housed in the obscure bedroom of a hospital porter. These times are long past and can never return. Reading about them, I am left with the impression of a pleasant social life in the profession. Good companions for the most part, making rare visits to Europe, partly to cultivate the old relationships and partly to keep themselves abreast of what was new in the world of medicine. When a colleague applied for leave of absence and it was known that he was starting for Europe, a friendly custom grew up of giving him a good send off. The profession met together, for everybody knew everyone in those days, fed him, often gave him a piece of plate as a token of their regard, wished him God-speed and a safe return. On his part, when he came back he called them together to tell them what he had seen and what he had learned, and in this way first-hand knowledge spread with extraordinary rapidity, and what seemed worth trying was tried at once. Such journeys were not infrequent. Fees were high, money was abundant, fortunes were made, and there was a proud record in

1806 that not a single medical man had become insolvent during the year. It was literally the golden age for doctors until the bad times came, banks failed, and the real estate in which they had invested their fortunes became almost valueless. By that time the profession in Australia had come into its own. Books and periodicals were abundant. They had been extraordinarily scarce and difficult to obtain. Medicine became international and surgery in Australasia soon took its proper place.

We welcome no one more gladly at the present time than your young medical graduates who come over for post-graduate study. They are clean-living, keen, active, painstaking, anxious to learn as much as possible during their short stay amongst us, and then to return home to settle. They are courteous alike to the patients and to the seniors under whom they work. These young graduates, of course, are all picked men, and have held responsible positions in your hospitals. They have been taught and perhaps, on occasion, have been "dressed down" by those who, like yourselves, are masters in the world of surgery. We shall regret them very sincerely if the success of this Royal Australasian College of Surgeons lessens the number of such men who come over to Europe.

And so I end with the hope that my little paper will not meet with the neat but devastating criticism made by a French surgeon after hearing an address on a similar occasion. He rose and said, "Monsieur, I have listened attentively to what you have read. There is much that is old and something that is new. Unfortunately, what is old is well known; what is new is not true", and sat down.

SOME RECENT STUDIES ON INTESTINAL OBSTRUCTION.[1]

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THE cause of death in intestinal obstruction has engaged the attention of numerous workers during the last twenty-five years. The variety of types of obstruction which may occur and the complexity of the bodily changes which result from them, have made this at once a fascinating and difficult problem. Sir Frederick Treves, half a century ago, recognized the distinction between the two main types, simple obstruction and that complicated by interference with the blood supply of the intestine, but it is only during the last decade that it has become evident that in these two conditions wholly different causes lead to the fatal result.

In simple obstruction the site of obstruction determines the rapidity of onset of the symptoms and their severity. The upper portion of the alimentary tract is mainly secretory in function. The duodenum receives food mixed with a large volume of gastric juice, and into it are poured its own secretions, the pancreatic juice and the bile. Intestinal digestive juice is supplied by the upper part of the small intestine, but the functions of the ileum are mainly absorptive. The duodenum and upper portion of the jejunum are more richly supplied with vessels and nerves.

Simple obstruction is followed by a complicated chain of events, and it is not surprising that a variety of explanations has been offered of the fatal result which follows if the condition is unrelieved. In the alimentary tract itself obstruction involves stasis of semi-digested food and of alimentary secretions above the block and collapse of the gut below it with cessation of the normal absorptive processes. There is increased peristaltic movement above the block, intense efforts being made to pass the obstruction. This results only in increased pressure in the lumen above the obstruction, which is further increased by secretory activity in excess of normal. Reversed peristalsis may occur and vomiting takes place, first of gastric and later of intestinal contents. Though this is in part beneficial, since it relieves intra-intestinal tension above the obstruction, its late effects are disastrous. The sufferer is not obtaining his normal intake of food and water and he is not reabsorbing the water, salts and other valuable constituents in his digestive secretions. It has been estimated that the

[1] An address delivered before the Royal Australasian College of Surgeons on July 12, 1934.

secretions poured out into the stomach and duodenum in man may attain to seven to nine litres in twenty-four hours. He must, therefore, as Hartwell and Hoguet[1] (1912) first pointed out, suffer from dehydration when simple obstruction occurs high in the small bowel. There is also loss of sodium chloride and hydrochloric acid in the gastric juice and of sodium bicarbonate in the pancreatic juice. If the loss is principally of gastric juice, the condition will be complicated by a rise in the body reserve of bicarbonate. Excessive loss of alkaline pancreatic and intestinal secretion may involve a fall in the bicarbonate reserve of the plasma. Stasis of the intestinal contents is accompanied by fermentation and gas is produced, which adds to the tension in the gut above the obstruction. If this reaches a sufficient level of pressure, it may cause cessation of blood flow through intramural vessels, with consequent damage to the wall of the intestine.

The central feature in this chain of events is the discharge of afferent nervous impulses from the site of obstruction. The increased peristalsis is in part due to local reflexes in the intestinal wall, but the increasing distension is attended by numerous volleys of impulses which do not all rise into consciousness, but which result in further peristaltic efforts, increased secretion and vomiting. The pain is intermittent and cramp-like and related to peristaltic efforts—it is, in short, that universally associated with strong spasmodic contraction of plain muscle.

If distension above the site of obstruction is not sufficiently relieved by vomiting, more intense nervous discharges occur. Some indication of the remote effects which may be so produced is indicated by the recent experiments of Taylor, Weld and Harrison[2] (1933), who have shown that, without obstruction of the lumen, without stasis of bowel contents, and without dehydration or loss of salts, death may result from local distension of the gut in twenty-four to forty-two hours. In these experiments in dogs a balloon partly surrounding a patent tube of stiff rubber was inserted into the small intestine high up in the jejunum and increased pressure was applied by distending the balloon. If, however, the intestine in this region had earlier been completely denervated, no symptoms resulted from the distension. It should be borne in mind that this acute distension is not analogous to the slower distension caused in intestinal obstruction, and though extremely widespread effects may be caused by the nervous reflexes set up in this way, they probably do not come into play until a loop above the obstruction is strongly distended.

Herrin and Meek[3] (1933) produced distension with balloons in open fistulous loops of the upper part of the jejunum in dogs, the continuity of the intestinal tract being maintained by entero-anastomosis. They observed a train of symptoms similar to, but rather less rapid in onset and course than, those of acute high intestinal obstruction. Dehydration and loss of salts occurred and death resulted on about the eighth day. They did not obtain these effects when the fistulous loop had been denervated, nor when the distal end of the fistula had been connected to the continuous intestinal tract, thus preventing loss

of secretions to the outside. Toxæmia is excluded in these experiments, which emphasize the importance of distension. This by setting up afferent nervous discharges causes anorexia and increased secretion of digestive juices with resulting loss of water and salts.

That dehydration and demineralization are important factors in high intestinal obstruction is attested by observations too numerous to describe in detail. Hartwell and Hoguet[1] (1912) succeeded in keeping dogs alive by saline infusions after producing in them pyloric or duodenal obstruction. MacCallum's observations[4] (1920) pointed to loss of gastric juice as the central feature in death from pyloric obstruction. Haden and Orr[5] (1923) found that lowering of chloride content was the first notable change in the blood in simple high obstruction. They were able to keep dogs with duodenal obstruction alive for from twenty-one to twenty-eight days by the administration of large volumes of normal saline solution, though distilled water or solutions of dextrose, sodium bicarbonate, or of other salts were without avail.

An interesting point emerged from the experiments of Hausler and Foster[6] (1925). The administration of saline solution for four or five days to experimental animals with high obstruction appeared to insure survival for just about as long as if it were continued after this critical period. This suggests that there is some adaptation to low levels of blood chloride. The rate at which dehydration and demineralization are produced must be important.

That a low blood chloride alone is not adequate as a cause of death was recently shown by Taylor, Weld and Harrison,[2] who produced and maintained low blood chloride levels in dogs by the repeated administration of histamine to stimulate secretion of digestive fluids, followed by lavage or the injection of apomorphine. Their animals appeared to be perfectly well, despite their low blood chloride level. In these experiments there was no dehydration. It should be remembered that in intestinal obstruction bile salts and other possibly important constituents of the secretions are also lost.

According to White and Fender[7] (1930), animals with total obstruction of the upper small intestine can be kept alive as long as loss of digestive secretion is prevented and nutrition is maintained by restoration of the vomitus through an ileostomy; and Jenkins[8] (1929 and 1932) has demonstrated that high obstruction in the dog is compatible with life if the biliary, pancreatic and duodenal secretions are short-circuited below the point of obstruction. Finally, Morton and Pearse[9] (1931) have recently shown that the symptoms and time to death in simple obstruction and in complete fistula of the jejunum at the same level are identifical both in rats and in dogs.

It is certain then that the dominant feature in high simple intestinal obstruction is loss of water, salts and other constituents in the digestive juices. In this type of obstruction distension is probably only important in causing loss of water and salts by increased secretion and vomiting and by decreasing absorption in the intestine above the obstruction.

There is no clear evidence that toxæmia of any kind is concerned in death from high simple intestinal obstruction.

When simple obstruction occurs low down in the small intestine there is a balance between secretion and absorption. Distension above the obstruction develops slowly and vomiting occurs later in the picture. There is interference with the normal absorptive processes and finally absorption may cease. Stasis of the contents allows of the accumulation of gas from bacterial action, and distension of the bowel leads to impairment of the circulation in the wall which hampers absorption. In these cases and in experimental animals the administration of saline solution is without effect, and, as Hausler and Foster[6] (1925) and Elman and Hartmann[10] (1929) have shown, the fall in blood chloride is relatively slight. There is no appreciable dehydration nor loss of the constituents of the digestive secretions. In dogs, low obstruction is fatal in five to seven days, instead of three or four as in high obstruction.

Raine and Perry[11] have produced ileal obstruction in rabbits, and have found that in these animals diminution of intra-intestinal pressure, by removing stomach contents, increases the time of survival, and increase of intra-intestinal pressure by introducing 120 cubic centimetres of liquid albolene into the stomach decreases the time of survival. Distension causes increased secretion, but diminution of pressure diminishes secretion and promotes absorption. The therapeutic value of saline solution increases as the intra-intestinal pressure diminishes, and decreases as the pressure increases.

These results are of considerable interest, but it should be remembered that the alimentary physiology of an herbivorous animal differs greatly from that of man. The rabbit is unable to vomit, and when obstruction is relieved there is less tendency for functional obstruction to persist.

The cause of death in low simple intestinal obstruction remains uncertain. Distension is obviously of great importance. It interferes with absorption by producing stasis in the intramural vessels and allows the accumulation of intestinal gases by failure of absorption. It may squeeze blood out of the splanchnic bed and greatly disturb the portal circulation. Sudden and rapid decompression may be attended by far-reaching changes—filling of the large splanchnic veins and dilatation of the intramural capillaries may involve the sudden withdrawal of a large volume of blood from the greater circulation. Elman[12] (1933) has drawn attention to the late and rather sudden development of symptoms of shock which may immediately precede death. He has observed that sudden deflation of greatly distended bowel above a long-standing obstruction may be followed shortly by a fatal result. He cites Heusser and Schär[13] (1930), who observed a similar occurrence following relief of an obstruction by band in a child, and who made closed intestinal loops in rabbits and laid them open twenty-four hours later when distended, the animals dying within ten minutes. Elman suggests that sudden collapse of the distended bowel may open a large

vascular field with results similar to those produced by obstruction of the portal vein, namely, loss of circulating blood into distended splanchnic vessels. An alternative explanation is the rapid absorption of toxic substances which have accumulated in the distended bowel, but which failed to be absorbed while the bowel was distended. He advises slow decompression by a mushroom catheter within the lumen of a loop of distended bowel. The tube is brought out through a separate stab wound and clamped and released at frequent intervals.

Admittedly the contents of the obstructed intestine are more toxic than those in the normal ileum, but satisfactory evidence is still lacking of absorption of these toxic substances in the circulating blood or lymph.

In obstruction of the large bowel the symptoms are even less acute in onset than in the lower part of the ileum. Practically the whole absorbing as well as the secreting area of the alimentary tract is above the site of obstruction. There are no changes in blood chloride level, there is no evidence of toxæmia; anorexia and inanition are the dominant features, and the fatal result may be brought about by acute inflammatory processes at the site of obstruction. In experimental obstruction of the large bowel death takes place in the course of weeks from inanition.

Before passing to the discussion of the changes which take place in obstruction complicated by strangulation it is necessary to discuss a group of experiments which, while not wholly comparable with either simple or complicated intestinal obstruction, throw some light on these conditions. In 1912, Whipple, Stone and Bernheim[14] found that they could produce the symptoms of acute intestinal obstruction experimentally without interruption of the continuity of the alimentary canal, by excluding a loop of intestine with its own vascular and nervous supply intact, restoring the continuity of the bowel above and below the loop by entero-anastomosis and closing both ends of the isolated loop. Closed intestinal loops in the colon and ileum are compatible with survival, and occasionally survival occurs whatever the position of the loop, except when they include the duodenum. Such closed loops receiving the secretions of the liver and pancreas are always fatal. Generally speaking, short loops are more rapidly fatal than long ones, and in a high proportion of experiments with short loops perforation of the distended loop and peritonitis precede death.

Dragstedt and his colleagues[15][16] (1917, 1919) found that open loops allowed to drain into the peritoneum did not always cause death from peritonitis, and, when these became sterile, closure of the loop was not attended by a fatal result, even if the blood supply were occluded. Washing loops with water and ether, with alcohol or astringents, such as tannic acid or alum, before closing them, also resulted in a proportion of survivals. Such closed loops were not sterile and were invariably fatal if the blood supply was occluded.

These authors realized that these closed loop experiments were comparable in their symptoms and pathology to cases of acute obstruction in man complicated by occlusion of the blood supply, as

in volvulus. They are of interest in indicating the part played by bacteria in the production of toxins. The aseptic infarction of intestine is not fatal and the products of destruction of sterile intestine are not toxic. Draining the isolated loops into the peritoneum or washing the mucosa with ether or astringents may prevent rapid secretion and consequent distension in the closed loops. Furthermore, it is not certain to what extent these procedures may have affected the sensory endings in the wall of the bowel and altered their response to subsequent distension. In experiments with closed loops the early symptoms result from distension, and the late results, if not complicated by perforation and peritonitis, are due to toxæmia of bacterial origin.

The part played by distension is clarified by the experiments of Burget and his co-workers[17] (1930), who have moored closed jejunal loops to the peritoneal surface of the anterior abdominal wall and subjected them to repeated aspiration. The animals remain in good condition. Anorexia is the first symptom that appears with distension, and this is at once relieved by aspiration. After a certain critical period is over daily aspiration ceases to be necessary.

Taylor, Weld and Harrison[2] also experimented with closed loops, previously rendered sterile by prolonged drainage to the exterior. Closure of the loops in four out of six animals caused death in two to three days with symptoms of intestinal obstruction. These authors do not state which part of the intestine was used for their loops. If toxæmia was present it is very unlikely to have been of bacterial origin, and distension alone may have caused the fatal results.

The complication of strangulation enormously increases the acuteness and danger of intestinal obstruction, and here toxæmia plays an important rôle. The patient may still die of a fatal toxæmia or of peripheral circulatory failure, even if the obstruction and the strangulation are relieved and the strangulated bowel is viable.

In strangulation the pain is more severe, and, instead of colicky, intermittent, cramp-like pains, is continuous and agonizing. There may be tenderness at the site of obstruction. There is frequently a rise of temperature to 37·8° or 38·3° C. (100° or 101° F.), and there is a decided fall of blood pressure. A rise in the leucocyte count is also of diagnostic import.

Hausler and Foster[18] (1924) studied the effects of venous obstruction in long and short lengths of intestine. With long segments there was a rapid fall in blood pressure and temperature and increase in the pulse rate, the animals dying from shock. With short segments toxæmia and peritonitis preceded death. When the short segments were excluded from the peritoneum by enclosure in a rubber bag, life was prolonged. Obstruction of the arterial supply produced none of the symptoms of shock, and death resulted from peritonitis.

Holt[19] (1934) has recently pursued this line of inquiry. According to this author, when long loops are strangulated, with predominantly venous obstruction, there is no evidence of toxæmia, but the fall of

blood pressure is due to loss of blood into the affected loop. This loss may amount to 4% of the body weight or half the blood volume which, according to Blalock,[20] is sufficient to cause fatal circulatory shock. In moderate sized loops the absorption of the highly toxic fluid which exudes into the peritoneum determines the fatal issue, the fluid becoming toxic about twenty hours after the onset of strangulation. With the unrelieved obstruction of very short loops death takes place from perforation of the distended loop and peritonitis. If the strangulation is total, both arteries and veins being obstructed, death results from a combination of toxæmia and peritonitis resulting from the action of bacteria on the wall of the gut and invasion of the peritoneum. Scott and Wangensteen[21] (1931, 1932) have also studied the effects of strangulation and have concluded that with long loops the cause of death is loss of blood into the strangulated region.

With these long loops death takes place too rapidly for toxæmia to develop. The longer the loop of bowel strangulated, the shorter is the time to the death of the animal. Obstruction of the venous return from a long loop involves not only considerable loss of blood into the loop, but rapid distension of the gut. The distension factor cannot here be overlooked, and the remote effect of afferent nervous discharges must be added to the loss of blood into the loop. In loops of short or medium length, if the strangulation is not tight enough to block immediately the passage of nervous impulses, the rapid distension, which occurs when venous return is predominantly affected, must be of considerable importance. In these the amount of blood lost is not adequate to cause fatal shock.

With strangulated loops of moderate length, life, in animals, may be prolonged by enclosing the loops in a rubber bag or by bringing the loop out on to the surface (Chenut,[22] 1926). Holt has provided evidence that the material which exudes from such loops into the peritoneum is highly toxic between sixteen and twenty hours after strangulation, and has investigated the permeability of the wall of the strangulated loop. This did not become permeable during the course of obstruction even to simple salts like potassium ferri cyanide, which, placed in the lumen, could not be demonstrated in the exudate. Repeated removal of the lumen contents and replacement by air failed to prolong life. Further, the volume of toxic fluid exuding from the wall of a strangulated loop was very large in proportion to the total amount secreted into the lumen. He believes therefore that toxins are produced in the intestinal wall following its invasion with proteolytic bacteria from the lumen.

There is fairly general agreement that the toxin produced within the lumen in strangulation or in closed loops, as Whipple and his colleagues[23] (1916) showed, is akin to the proteoses. It is precipitated by five volumes of alcohol, does not pass a Berkefeld filter, is not destroyed by heat and, finally, as Dragstedt and Moorhead[24] (1918) showed, it is non-antigenic. It is therefore a proteolytic product and

not a bacterial exotoxin. The toxic exudate which escapes into the peritoneum in strangulation also contains toxic substances similar in their behaviour to proteoses—heat stable, non-filterable and precipitable by alcohol.

Histamine-like substances are also present in the exudate, but it is not clear how much they influence the result. It is interesting that effects like those due to histamine were observed by Holt shortly after the injection of his dogs with filtered exudate, though these animals all recovered. McIver and his colleagues[25] (1929) found substances having a strong depressor effect in a dialysate obtained by incubating a strangulated loop suspended in saline solution. The part played by histamine has also been studied by Dragstedt,[26] who has demonstrated it in amounts which he regards as sufficient to account for some part of the toxicity of the fluids in closed loops and in obstructed intestine.

It is perhaps surprising that, despite all this experimental work, more improvement has not been achieved in combating the mortality of intestinal obstruction. Most of the recent studies of the results in large hospitals show a gross mortality of the order of 40% to 45%. All these studies show that the mortality is determined by the time elapsing between the onset and surgical treatment, the frequency and degree of strangulation and the age of the patients. The most fully analysed recent series is that of McIver[27]—the figures for the Massachusetts General Hospital from 1918 to 1927. There were 335 cases of acute obstruction with a gross mortality of 31%. The group, which excluded obstruction due to neoplasms or strangulated external herniæ, contained 156 cases and showed a mortality of 44%, whereas the strangulated external herniæ, 147 in number, had a mortality of 18%. There were only eight uncomplicated high obstructions in this series. The infrequency of this condition, as McIver points out, explains the relatively small influence of the free use of saline solution in treatment upon the gross mortality of intestinal obstruction.

At this stage it may be desirable to indicate a few general principles of treatment. McIver[28] has recently made two most excellent contributions to this subject, which admirably sum up modern principles. Obstruction should be relieved as early as possible, but some pre-operative treatment is necessary in most cases. Pain should be relieved by morphine so soon as the diagnosis has been made. The patient should be kept warm and exposed as little as is needful. This is particularly important in strangulation of long loops. Water and salt loss should be combated by the copious administration of isotonic saline solution intravenously, subpectorally and *per rectum*. Gastric lavage is indicated not only as a prophylactic against inhalation of vomitus during the anæsthetic, but also to relieve distension. It may be advantageous to return the vomitus *per rectum*. The administration of saline solution should be started immediately and continued after the operation.

In the choice of anæsthetic the desiderata are good relaxation and the minimum subsequent depressant effect on the circulation. Ethylene,

apart from the risk of explosion, is the best anæsthetic. Ether inhibits peristalsis and may be followed by collapse. Spinal anæsthesia gives excellent relaxation and cuts off the splanchnic innervation, antagonizing functional obstruction, but may be attended by dangerous collapse. Local anæsthesia avoids the risk of inhalation of vomitus, but does not give the full relaxation which is so desirable for gentle exploration. In late operations it is the anæsthetic of choice.

In operating, delicacy of manipulation is the first requirement. Damaged bowel is very intolerant of even the lightest handling. In locating the seat of obstruction it is well to follow collapsed gut upwards. The nature of the free fluid in the abdomen will afford a clue to the presence or absence of strangulation. When this is blood-stained and odorous it signifies the presence of strangulated gut. Stripping the bowel and all unnecessary handling are strongly contra-indicated. In animal experiments stripping normal bowel is attended by a temporary fall of blood pressure, but stripping bowel which has been distended may result in a fall of blood pressure from which the animal does not recover. At operation, distended loops may be emptied with least damage by aspiration through a hypodermic needle.

If there be indeed a danger from sudden relief of distension the distended bowel should be slowly deflated following the relief of the obstruction at operation, and in low simple intestinal obstruction an enterostomy by catheter in the manner suggested by Elman may be indicated. Much may be done by continuous aspiration from the stomach through a nasal catheter or similar treatment with a tube passed into the duodenum. If the obstruction is in the large bowel and the patient extremely ill, a caecostomy should be performed.

When there is strangulation of a loop sufficiently long to cause primary peripheral circulatory failure, transfusion from a suitable donor is indicated.

If there is any doubt as to the viability of strangulated bowel, it must not in any circumstances be left in the abdomen. The appearances of muscular activity after emptying the loop as well as the changes in appearance which result from relieving the strangulation are the best guides. The mortality attending excision and anastomosis is over 70%. In McIver's series,[28] in 22 resections there were 16 deaths. Of nine patients, in whom anastomosis was done immediately, seven died, and of thirteen, in whom anastomosis was delayed, nine died.

High enterostomies are very fatal in experimental animals. If, therefore, the necrosis involves the upper part of the jejunum, immediate entero-anastomosis following excision is indicated. The essential indications in strangulation of short and medium lengths of bowel are to relieve the strangulation and to remove necrotic or doubtfully viable gut outside the abdomen, so making it impossible for further absorption of toxin to occur. This may be done either by excision and immediate anastomosis or by suturing the peritoneum around the extruded loop,

excising it and joining the proximal and distal ends of the healthy bowel by tying in Paul's tubes connected with rubber tubing.

No discussion of intestinal obstruction would be complete without some consideration of functional obstruction. This has been produced experimentally by Arai[29] by prolonged rough handling of normal bowel, and by intraperitoneal injection of iodine. True functional obstruction results post-operatively from rough handling of the bowel or as part of the picture of peritoneal infection. Good anæsthesia with good relaxation and the utmost delicacy in handling the intestine are all of the first importance in avoiding this dangerous condition. Post-operative restriction of fluids administered orally is a useful prophylaxis.

The ætiology of functional ileus is still quite uncertain. Possibly it may result from over-stimulation resulting in excessive efferent nervous discharges via the splanchnic nerves. Upon this supposition splanchnic block and spinal anæsthesia have been proposed for its relief. Ochsner and his colleagues[30] have investigated their value experimentally and report favourably upon the use of repeated splanchnic block.

Morphine, 0·01 gramme (one-sixth of a grain), given every three hours, is useful in reducing the afferent impulses which determine this predominantly inhibiting discharge via the splanchnics. Immobility involves distension, gas being evolved by the stagnant intestinal contents, and this probably forms part of a vicious cycle. It is of the first importance to reduce the distension. The large bowel may be emptied by a small enema and a rectal tube inserted and kept in position. The stomach should be emptied and the distension of the bowel may be reduced by continuous aspiration through a nasal catheter, passed into the stomach or through a duodenal tube (Wangensteen,[31] 1933).

Heat applied to the abdomen may help by expanding the gas and moving it along the intestine, and may increase the rate of blood flow in the intestinal vessels, thus aiding the absorption of gas, but it might be anticipated that expansion of gas would only increase the tension within the gut and further hamper its absorption.

The experimental evidence concerning the value of drugs is contradictory and disappointing. Ochsner and his colleagues[32] conclude that pituitrin is ineffective, and may actually decrease intestinal tone and mobility; that the action of acetylcholine is predominantly vaso-dilator, and that it has little effect on distended intestine. The recent studies of Carmichael, Fraser, McKelvey and Wilkie[33] suggest that "Prostigmin" may be of some value, but in their experience it sometimes failed when pituitrin was effective. It appears to be less toxic than physostigmine, which general has some effect in increasing intestinal tone and mobility. The intravenous injection of hypertonic saline solution (5%) has been recommended. None of these remedies should be tried unless it is certain that the obstruction is wholly functional.

SUMMARY.

Summarizing this brief and very incomplete review, it appears that the dominant factor in simple obstruction in the ileum and in functional ileus is distension; in simple obstruction high in the bowel it is loss of water and salts; in strangulation of long loops, loss of blood from effective circulation; and in strangulation of shorter loops, toxæmia.

These ætiological considerations determine the principles of treatment which may be briefly summed up as follows: (*a*) In functional obstruction, to reduce distension. (*b*) In mechanical obstruction, to relieve the obstruction, to combat dehydration and demineralization, and to relieve distension. (*c*) In strangulation, to maintain the blood volume, and to remove the source of toxin from the abdominal cavity.

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DIVERTICULA OF THE FEMALE URETHRA.

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DIVERTICULA of the urethra are not common in either sex. Up to the present the number reported as arising from the male urethra has not yet reached one hundred, while the incidence in women is much smaller still. In the majority of urological and gynæcological textbooks diverticula of the female urethra receive but passing mention, with emphasis on the rarity of the condition, or no mention at all. Even in Young's classic handbook[1] no reference is made to them. Apparently the only three works which devote any attention worthy of the name to the condition are the *"Handbuch der Urologie"* compiled by von Lichtenberg and other authors, and the works by Cabot and Catherine Lewis. Latzko[2] in the first-named, Osgood[3] in the second and Lewis[4] briefly discuss their origin, clinical features and treatment.

These diverticula have again received similar scant mention in current periodicals, and in English literature almost none. It is not possible, however, to form a completely accurate idea of the total number so far reported, on account of the inaccessibility of most of the references. Gorowitz[5] in 1928 reported a case which he treated by excision, and discussed in great detail the origin, symptomatology and treatment of the condition, while Shier[6] reported a very similar case two years later. Catherine Lewis[7][8] has reported two cases treated by operation, in one of which the diverticulum contained calculi, while Frank Kidd[9] mentions having successfully treated a case of "congenital pouch", the only one seen in a series of six hundred and fifty women and female children who passed through his clinic at the London Hospital. Furniss[10] states that he has seen some half dozen cases of quite small urethral diverticulum. Edwards[11] has had a patient who had two urethral diverticula, which he treated by excision. Only one other instance of multiple diverticulum formation has been reported, by Pepere.[12] Twenty other references to the condition have been found, all, however, unobtainable in Australia, so that the total number of fully reported cases almost certainly does not exceed thirty.

It is very probable, of course, that many of these diverticula exist without ever causing symptoms severe enough to make the patient seek medical advice, while equally probably the condition may be often missed, as in most instances it will not be found unless it is thought of and specially looked for. Both on account of the uncertainty which exists regarding their manner of origin, due doubtless in great part to their

rarity, and of the importance of recognizing their presence when they do cause symptoms, these diverticula are worthy of more detailed study than they usually receive. This is especially so in view of the fact that no systematic account of them has so far appeared in English or American literature.

Two further cases are now reported.

CASE I. The patient, who was aged fifty-nine years, married, complained of an intermittent, dull, aching pain in the left loin for ten years. For the past year she had also had attacks of "cold shivers", occurring every few weeks. She passed urine five or six times during the day, and three or four times at night, and had done so for years. There had been no pain or scalding on micturition. Some years previously she had had slight occasional hæmaturia. There were no other symptoms.

She had had one full term pregnancy thirty-three years previously. This and her confinement were uneventful. Twenty-two years ago she had undergone salpingectomy for ectopic gestation. There were no other previous illnesses.

When referred for investigation, she had already had an X ray examination of her urinary tract. The report of this read as follows:

> Multiple opacities in the left renal area, almost certainly multiple calculi. Opacity in the line of the right pelvic ureter, possibly calcification of an ovarian tumour. Opacity below the *symphysis pubis*, almost certainly a large stone, ? in the bladder.

FIGURE I. Case I. Plain skiagram of lower urinary tract, showing calculus in urethral diverticulum.

Abdominal examination revealed no abnormality, except the scar of an old mid-line subumbilical incision. Vaginal examination disclosed a stony hard, insensitive swelling in the line of the urethra, a little over 2·5 centimetres (one inch) distant from the external urinary meatus. The urine contained many pus cells and motile organisms.

Cystoscopy was carried out. There was no urethral obstruction. The bladder wall showed mild cystitis and the ureteral orifices were normal. There was no sign of vesical calculus. The right ureter was catheterized without obstruction, while the left was obstructed at the uretero-pelvic junction. X ray examination revealed a large shadow, apparently due to a calculus, in contact with the tip of the left ureteral catheter, and several smaller shadows, apparently due to calculi in the lower calyces of the left kidney. In the film of the lower urinary tract (Figure I) the shadow observed in the previous film was again present, in the

line of the urethra and well below the bladder. The other opacity present had no relation to the right ureter. A left pyelogram showed advanced intrarenal hydronephrosis. The function of the right kidney was excellent, while the left kidney was almost functionless. The left kidney urine contained many pus cells and returned a culture of *Bacillus coli communis*, while that from the right kidney was free from pus and sterile.

Examination of the urethra with the McCarthy panendoscope revealed a normal mucosa. About 2·5 centimetres (one inch) from the bladder neck, and just to the right of the mid-line, was a moderately large diverticular orifice, discharging muco-pus, and corresponding in position to the shadow seen in the skiagram and the swelling felt on vaginal examination. The patient thus had a left infected calculus hydronephrosis and an infected urethral diverticulum containing a calculus.

FIGURE II. Case II. Diverticulogram, contrast medium being 12·5% sodium iodide solution. Some of the solution has overflowed, diluting the contents of the bladder, which is also outlined, though more faintly.

Left nephrectomy was advised. Operation on the diverticulum was not advised, as it was doubtful whether it was responsible for any of her symptoms.

CASE II. The patient, who was aged forty-eight years, married, complained of intermittent soreness of the vulva for six years. At times she would feel perfectly well, while at others sitting down would cause her a certain amount of discomfort. She had some frequency of micturition, varying from normal to four or five times during the day and four times at night, with occasional slight scalding. Apart from a slight degree of dysmenorrhœa there were no other symptoms. She had had one full term pregnancy twenty-eight years previously, followed by an uneventful confinement and puerperium. She had had no illnesses or operations.

Abdominal examination disclosed no abnormality. Vaginal examination showed a moderately relaxed perineum and a well marked cystocele, merging into a diffuse swelling and thickening of the anterior vaginal wall. On the application of moderate pressure to this about four cubic centimetres (one fluid drachm) of turbid fluid escaped from the urethra. Her urine contained about ten pus cells per high power field and a pure culture of *Bacillus coli communis* was obtained from it. X ray examination of the urinary tract revealed no abnormality.

Cystoscopy revealed mild generalized cystitis, and no other abnormality. There was no urethral obstruction. Urethroscopy revealed a small orifice, apparently of a diverticulum, about half-way along the urethra and just to the right of the mid-line posteriorly, being partly concealed by an overhanging fold of mucosa. A ureteral catheter was passed into the orifice for a distance of 2·5 centimetres (one inch), ten cubic centimetres of sodium iodide solution were injected and a skiagram was taken. This showed quite clearly the circular outline of a diverticulum which had been filled by the iodide solution (Figure II). A small amount of solution had passed into the bladder, mixing with the water

which had filled it during the urethroscopy, and the bladder and diverticular shadows were quite distinct.

The patient was advised to undergo operation for the cure of the cystocele, and to have the diverticulum excised at the same time. She decided, however, that her symptoms were not sufficiently severe to warrant operation.

ÆTIOLOGY.

As has been mentioned, the rarity of diverticula of the female urethra renders it difficult to reach definite conclusions concerning their ætiology, and opinions regarding this differ a good deal. In the male the cause is in most cases much more obvious, and most authors believe that a certain proportion of these cases are of congenital origin, the remainder being acquired as a result of trauma or infection. It is hardly possible, however, to argue by analogy that those encountered in the female fall into the same two groups, not only on account of the totally dissimilar configuration and relations of the urethra in the two sexes, but also in virtue of the fact that the female urethra, being developed entirely from the vesico-urethral portion of the cloaca, is homologous only with that portion of the male urethra which extends from the internal urethral orifice to the verumontanum and orifices of the ejaculatory ducts. Diverticula of the female urethra, if congenital, would thus correspond embryologically to those arising from this particular portion of the male posterior urethra, which constitute a minority of urethral diverticula in the male, and which in the great majority of instances have been definitely of an acquired character, mostly following perineal operations. Bumpus,[13] who reported four such cases, believes that all such diverticula are acquired. McKay and Colston[14] also reported four cases out of a series of ten occurring in the male; three of these were acquired, while in the fourth the cause was not obvious. Thus little assistance is derived from a study of the comparatively large number of urethral diverticula that have been reported in males.

Several authors favour a congenital origin. Josephson[15] and Veit[16] at the end of last century, and Fromme[17] and Hohne[18] more recently, suggested that they might develop from persistent Wolffian rests. This, however, does not seem at all likely. These diverticula are situated more or less in the mid-line, while when Gärtner's ducts can be recognized they pass down in front of the lateral aspect of the cervix and vagina.[19] Furthermore, those cysts which are believed to develop from persistent portions of these ducts are characteristically situated laterally, and are more closely related to the vagina than to the urethra, with which there is no particular reason why they should ever communicate. So far as can be ascertained, though other authors favour a congenital origin, no other suggestions as to the actual mode of such origin have been made. It has been suggested that if the diverticulum is lined with urethral mucosa it is congenital, while if mucosa is lacking it is acquired, a statement which is not capable of proof and has little value. Another suggestion has been that if all layers of the urethral wall are present in that of the diverticulum it is congenital. Similar statements were made about diverticula of the bladder till Young[20] showed that

plain muscle was present in all of them, whether regarded as congenital or acquired. Latzko[2] does not believe that any such conclusions can be drawn from a study of the wall or the lining of the diverticulum, but considers that the cases of Veit,[16] Hohne[18] and Fromme[17] practically establish it as a fact that such diverticula may be congenital. The patient reported by the last mentioned observer presented a very remarkable condition, in which an accessory ureter opened into the diverticulum.

Other observers are equally confident that these diverticula can be acquired. Latzko considers that they are produced by the rupture into the lumen of the urethra of periurethral cysts derived from the urethral glands, and also from periurethral abscesses. He believes also that obstetrical trauma must be considered as a factor. Osgood[3] mentions as ætiological factors only trauma due to repeated confinements and periurethral abscess formation. Lewis,[4] on the other hand, believes that trauma plays no part, and that most diverticula arise as a result of glandular dilatation. Gorowitz[5] does not believe that any are congenital, stressing the fact that none have been observed in female children. He divides them into two groups: (i) true diverticula, of mechanical and traumatic origin, and (ii) false diverticula, of inflammatory origin. He believes that the great majority of diverticula are due to obstetrical trauma, while other causes may be undue roughness in packing the vagina, stricture of the urethra, intraurethral trauma or the passage of a foreign body.

It is thus extremely difficult to arrive at any certain conclusions regarding the origin of these diverticula. Of the possible causes of acquired diverticula, trauma has first of all to be considered. Trauma undoubtedly can lead to diverticulum of the male urethra, as exemplified by a patient reported by Sisk.[21] This patient sustained a ruptured urethra and later developed a diverticulum at the point of rupture. Rupture of the female urethra, however, must be excessively rare, and trauma of a degree which could be reasonably expected to be capable of leading to diverticulum formation has apparently not been a feature of any reported case. Obstetrical trauma has received a good deal of attention, and therefore merits consideration. Despite Gorowitz's convictions, if trauma sustained during parturition were the most frequent cause, one would expect these diverticula to be moderately common instead of the rarity that they are. Certainly one would expect more than thirty to have been reported. In most instances *multiparæ* who have developed urethral diverticula have had fairly uneventful confinements, while on the other hand the condition is not especially apt to follow difficult confinements. Damage to the urethra, if it occurs, is very seldom localized and so apt to lead to diverticulum formation, but more generalized, leading to partial or complete urinary incontinence. Furthermore, a fact of much greater importance, three instances have been reported of the occurrence of the condition in *nulliparæ*, two by Routier[22] and one by Lehmann.[23] For these reasons it would seem that obstetrical trauma as a potential ætiological factor can be discounted to a great extent, though it cannot be eliminated.

Other suggested acquired causes are periurethral abscess, glandular dilatation and rupture of periurethral cysts into the urethra. Periurethral abscess is rare in the female and has not been recorded in the previous history of any of the patients reported. If of any considerable size it would hardly have escaped attention. Furthermore, it apparently shows no tendency in the male to be followed by diverticulum formation. The suggestions that a diverticulum may originate as a glandular dilatation or as a result of the rupture of a periurethral cyst are at first sight more attractive than most of those discussed already, but with so few cases available for study their truth can be neither proved nor disproved. However, glandular dilatations of any degree are not common, and when they do occur are most frequently encountered in close proximity to the bladder neck, at a higher level than the site usually occupied by a diverticulum, while periurethral cysts, if they occur, must be extremely rare.

Thus none of the suggestions already made, or at all events none that can be discovered, appears to furnish a reasonably satisfactory explanation of the origin of these diverticula, though at the same time, owing to the dearth of material, it cannot be unequivocally stated that they are not tenable. One possible explanation, however, which appears at least as satisfactory as any so far advanced, is that the condition may be simply due to a localized congenital structural weakness of the urethral wall. A similar condition is generally accepted as being necessary for the development of diverticulum of the bladder, where the presence of superadded urinary obstruction results in a ballooning out at the weak spot. Diverticula of the female urethra, on the other hand, are not accompanied by obstruction, but its presence may not be necessary, even as only a very slight degree, or sometimes apparently none, may be evident associated with a vesical diverticulum. The female urethra is surrounded by plain muscle, and, given a localized area poor in muscle fibres, the general contraction of the urethra at the end of micturition would tend both to stretch such a weak area and to force a portion of the urine in the urethra at the moment of contraction against the weak spot, leading ultimately to a ballooning out which would become progressively larger. This suggestion appears to be at least as tenable as any other so far put forward.

STRUCTURE.

The structure of these diverticula requires little detailed attention. The wall consists of fibrous and plain muscular tissue, and is lined by mucous membrane with transitional or occasionally stratified squamous epithelium, which may show the presence of crypts. According to the degree of infection there is a variable amount of leucocytic infiltration, while the mucosa and submucosa may be replaced by granulation tissue. Calculus formation may occur, the presence of stagnation and infection providing ideal conditions for it.

CLINICAL FEATURES.

Symptoms may be, and probably often are, completely absent, and when present are not in any way characteristic, but due mostly to the presence of secondary infection. The patient may have a feeling of perineal discomfort or slight dyspareunia, while there may be some dribbling after micturition. The symptoms again may be only those of a coexistent chronic cystitis, varying in severity according to the virulence of the infection. Gorowitz[5] states that with severe infections virtual urinary incontinence may result.

Provided that the possibility of the existence of the condition is borne in mind, diagnosis should not present any particular difficulty. With a diverticulum of any considerable size, a swelling is palpable through the anterior vaginal wall, on pressure over which turbid fluid escapes from the external urinary meatus. Smaller diverticula, however, can show little evidence of their presence on vaginal examination. If calculus formation has occurred in the diverticulum, the stones are of course very easily palpable. If the orifice of the diverticulum is sufficiently large, a catheter passed along the urethra may catch in it and pass into the diverticulum.

The diagnosis is made absolute by diverticulography. On urethroscopic examination the orifice can be seen and a catheter passed into the diverticulum. After the injection of a few cubic centimetres of suitable contrast medium, such as sodium iodide solution or lipiodol, radiographic examination demonstrates clearly the size and extent of the diverticulum.

TREATMENT.

If the diverticulum is causing no symptoms, no treatment is necessary. In the presence of infection, treatment by repeated lavage, a suitable catheter being passed urethroscopically for the purpose, has been advocated by some. Good results have been reported, but mostly the improvement has been temporary and the symptoms have recurred when treatment has been suspended. Other authors have incised and packed the diverticulum, with the object of obtaining its obliteration, while others have incised it and cauterized the interior with the same object. Paraffin injections have been used by some. The treatment of election is resection of the diverticulum, with careful suturing of its connection with the urethra, the sutures being preferably placed anteroposteriorly rather than from side to side. Results have been good, and though some risk must exist no post-operative fistulæ appear to have been reported.

SUMMARY.

1. Two cases of diverticulum of the female urethra are reported.

2. The origin of the condition is discussed, and it is considered to be most probably due, in most cases, to a localized congenital structural weakness of the urethra, a suggestion which has apparently not been previously made.

3. The condition may be quite symptomless, while if symptoms do occur they are not in any way characteristic, so that the diagnosis may be easily missed.

4. Diagnosis is established by urethroscopy and diverticulography.

5. Treatment, if indicated, consists of resection.

ACKNOWLEDGEMENTS.

I wish to express my thanks to Dr. R. J. Silverton, who supplied me with a valuable reference[5] otherwise unobtainable, and to Dr. Adolph Bolliger for assistance in its translation.

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FACIAL HEMIATROPHY.

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A CASE of hemiatrophy, in which the right side of the face from the zygoma downwards appeared to be atrophied in an irregular manner, was recently shown by Sir Harold Gillies at the Royal Society of Medicine.[1] Obviously the condition was not due to a lack of development or growth on that side, but to a subsequent shrinking and disappearance of the subcutaneous tissues.

FIGURE I. Facial hemiatrophy, slowly progressive for thirteen years.

FIGURE II. Facial hemiatrophy after restoration by cartilage and fat grafts.

About three years ago I had a case extraordinarily similar in both appearance and history, affecting the left side of the face, more particularly from the ear to the chin (Figure I). Sir Harold Gillies repaired his case by means of fat grafts, whereas I used cartilage and fat (Figure II).

The interesting thing, however, about these cases is not so much their plastic restoration as their possible cause. In both these cases the history was almost identical. I have had several similar cases of

smaller and more localized atrophy, and the histories have been the same. A light coloured spot appears on the face in front of the ear, becomes pigmented and is followed by slow progressive atrophy. There is no history of pain, swelling or inflammation, or of pus formation. Nor is there subsequently any loss of sensation; there is no diminution of the blood supply and no facial paralysis. Have these histories any significance, or is it mere coincidence? One would think that the condition must be due to an affection of the neurotrophic nerves of the face; and, thinking this, I was somewhat doubtful as to the success of the rather extensive cartilage grafts which I employed. These, however, took without any trouble and, moreover, they are still there, and have not undergone any atrophy. But how can a small white spot, apparently without infection, cause an atrophy of the trophic nerves? Sir H. Gillies calls his case a lipodystrophy, but I think from his photographs it was possibly more than loss of fat. Certainly in my case the bone and muscles were affected also, though the muscles were still functional and the bone appeared to be normal. This condition resembles somewhat in appearance those unfortunate cases one used to see after forcible avulsion of the sensory root of the Gasserian ganglion.

I think we may recognize three distinct types of facial hemiatrophy:

1. Congenital, not uncommonly associated with facial paralysis and deformities of the external ear, and therefore causally, one would presume, due to an embryonic fault in the temporal bone.

2. Those cases associated with a torticollis, which are really more under-development of one side rather than a true hemiatrophy.

3. The acquired cases such as are referred to in this note.

Thoma[2] records a case of progressive atrophy of facial bones with complete atrophy of the mandible, which appeared to follow acute dental sepsis, but which he summarizes thus:

The involvement of the bones in the distribution of the fifth cranial nerve and its ganglia and the persistent pain connected with the resorption suggest classification of the disease as a neurotrophic atrophy.

This case, however, seems to have been largely bilateral, and was characterized by pain, while the cases I have in mind are not.

Cecil[3] suggests that the distribution of cases of facial hemiatrophy is that of the sympathetic nervous supply to the head region, and not that of any cranial nerve; and states that removal of the superior cervical ganglion has been attempted for its relief.

These cases of hemiatrophy have no connexion, I think, with general lipodystrophy (as described by Barraquer in 1906), which affects the upper part of the body and face, the cause of which "remains an unsolved mystery".

Cases of localized lipodystrophy have been recorded by Depisch in Germany and Barborka in America following repeated injection of insulin. Upon injecting the insulin into a series of rats no loss of

fat occurred. It was therefore presumed that the localized lipodystrophy seen in the patients was due to repeated local irritation or infection.

This brings me to the suggestion that the third type of facial hemiatrophy (? lipodystrophy) is due to some hitherto unrecognized type of infection of a non-suppurative kind and having some selective affinity for neurotrophic nerves.

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Case Reports.

GENERALIZED OSTEITIS FIBROSA WITH PARATHYREOID ADENOMA.

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REMOVAL of a parathyreoid tumour for the relief of generalized *osteitis fibrosa cystica* was first performed in 1926 by Mandl, of Vienna.[1] By September, 1933,

FIGURE I. Upper third left femur, November 3, 1933. Note marked erosion of neck of femur, cyst formation in femur and ileum.

sixty operation cases had been recorded[1] and further reports are still appearing in the literature, notably the eleven cases of Churchill and Cope.[2] In this country no case other than Kilvington's, recorded by Scott,[3] has as yet been published. The following case may thus be of interest.

[1] It is interesting to note that Mandl's original case has since been reported as being one of Paget's disease and not *osteitis fibrosa*.

Clinical History.

Miss P., aged fifty-three years, commenced to suffer, some three years prior to operation, from pain in the region of the left hip. This continued and was followed about a year later by pain in the right thigh. She suffered from severe lassitude and gradually became crippled, until finally she could hobble about only with the aid of two sticks. She had been treated for some months by rest in bed and "Adexolin", and whilst she was taking the latter there was a certain amount of improvement in her general condition. She had never had any urinary symptoms of any kind.

FIGURE II. Upper third left femur six months after operation, showing reformation of neck of femur.

She was frail and weary, and in build resembled very closely the patient portrayed by Keynes and Taylor.[4] She had a kyphosis of the dorsal spine, a left *coxa vara*, and gross swelling of the terminal phalanges of the fingers. The urine contained an occasional pus cell. There was no palpable tumour in the neck.

X ray examination of the spine and pelvis disclosed gross decalcification and cyst formation. The necks of both femora were eroded, the left one extremely so. There were four small shadows in the right renal area, possibly calculi.

The serum calcium on November 4, 1933, was 18 milligrammes per 100 cubic centimetres.

As the diagnosis appeared to be certain, no further biochemical investigations were made and the patient was placed on a high calcium diet.

Operation was performed on December 9, 1933, the thyreoid gland being exposed in the usual way. No parathyreoid tissue was seen at the upper pole of the right lobe of the thyreoid, nor behind the œsophagus. When the lower

pole was dislocated forwards, a small reddish tumour was immediately seen projecting up through the fascial bed of the thyreoid. A little dissection showed this to be the apex of a considerably enlarged parathyreoid, which was removed. The left side of the neck was not explored.

Post-operative treatment was as follows: Calcium was given by mouth in the form of calcium lactate, 3·6 grammes (sixty grains) every day for six weeks, and also by intramuscular injection of 10% calcium gluconate, twenty cubic centimetres every day for fourteen days. Collips' parathormone was given in doses of up to twenty units a day for the first two weeks, and then occasionally during the next four weeks. Vitamin *D*, in the form of "Adexolin", was given in doses of four cubic centimetres (one drachm) daily for six weeks, then "Viosterol" was given in doses of eight cubic centimetres (two drachms) daily

FIGURE III. Clubbing of terminal phalanges.

for two weeks. Sun bathing was commenced after her discharge from hospital, fourteen days after operation.

None of the major symptoms of tetany were ever observed, but the following post-operative features appear to be worthy of note:

1. There was marked pyrexia until the seventh day, although there was no evidence of sepsis.
2. Slight icterus became apparent on the fourth day and reached its peak on the seventh.
3. On the sixth day a feeling of cobwebs over the face was complained of, and this symptom recurred at intervals for a fortnight. Concurrently a metallic taste in the mouth was noticed.
4. During the second week she seemed to be unduly listless and depressed. Mental depression became more and more pronounced, and by the fourth week it had become intense and rather alarming. Half or whole day remissions from the depression then began to occur. During these remissions the patient felt really well, but dreaded "the cloud coming over her mind" again.
5. It was not until two months after operation that she felt continuously well. She then found that she had much more energy than for several years, that she had less pain, and that she could walk much better and further. At the present time, seven months after operation, she feels very well, has very little

pain, does household duties of all kinds, and uses a single stick only when walking on uneven ground.

Serum calcium estimations are set out hereunder. On each occasion blood was collected in the morning on a fasting stomach.

November 3, 1933: 18 milligrammes per 100 cubic centimetres.
December 11, 1933 (two days after operation): 14·4 milligrammes.
December 15, 1933: 10·8 milligrammes.
December 18, 1933: 10·0 milligrammes.
December 22, 1933: 9·8 milligrammes.
January 4, 1934: 10·8 milligrammes.
March 14, 1934: 8·0 milligrammes.

FIGURE IV. Shortening and tufting of terminal phalanges. Cyst in second metacarpal. Taken six months after operation. Note density of proximal phalanges.

It will be noted that the serum calcium was within normal limits during the height of the mental depression.

Comment.

In this case, diagnosis was made easy by the fact that the clinical and radiological findings were confirmed by an extremely high content of calcium in the serum. Shortly after the publication of Hunter and Turnbull's[6] paper the

writer, when residing in another city, was able to collect two patients who clinically and radiologically appeared undoubtedly to be suffering from this disease. Operation was not performed, as in neither of them did the serum calcium, on several examinations, exceed the upper limits of normality. This phenomenon has since been frequently noted, and it has been found that in such cases it is necessary to determine the calcium balance, an undertaking that is at present beyond the resources of many institutions in this country.

FIGURE V. Four small shadows in right renal area, possibly due to calculi. There has been no change since operation.

The other point worth commenting on is that though this patient displayed none of the accepted major symptoms of tetany, there were certain symptoms which may yet come to be considered as belonging to this condition. These occurred while the total serum calcium was normal. Several writers have now drawn attention to the fact that symptoms of tetany, even severe ones, may

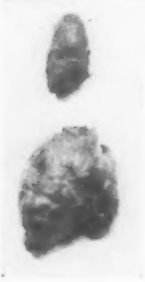

FIGURE VI. Parathyreoid gland, actual size. In two parts, as a small cyst uniting them was ruptured in removal.

arise in the absence of a low serum calcium. It is now known that calcium is present in the serum in two or more fractions (Gordon-Taylor, Wiles and Baker[6] and Taylor[7]), and that not all of it is diffusible or active, but the exact cause of the onset of tetany is not yet understood.

Acknowledgements.

I wish to thank Dr. R. G. McPhee for giving me the opportunity of treating this patient; Dr. H. F. H. Elvins, Dr. Douglas Thomas and Dr. Arthur Moreton for the X ray photographs and prints; Dr. Thomas also for the calcium investigations; Mr. Henry Searby for assistance at the operation; and Miss Wischusen for the microphotographs.

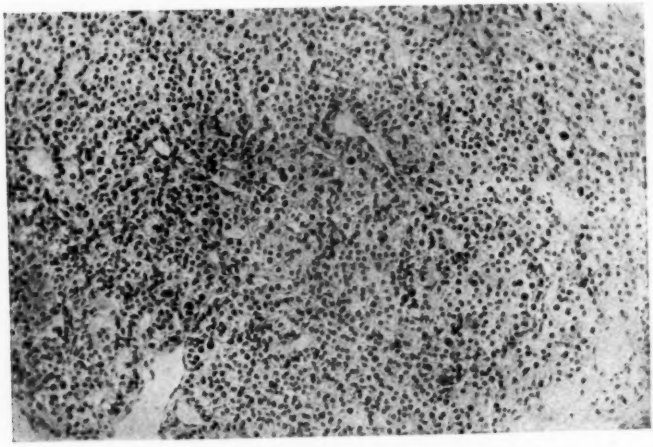

FIGURE VII. Parathyreoid tissue. × 137.

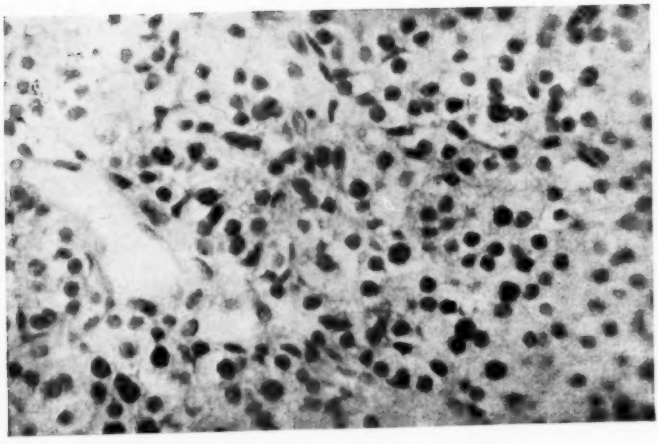

FIGURE VIII. Parathyreoid tissue. × 450.

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FRACTURE OF THE CAPITELLUM.

By H. WALDEN FITZGERALD,
Dunedin, New Zealand.

KOCHER[1] described this fracture and reported four cases in 1896 under the title "Fractura Rotuli Humeri". This injury is a comparatively rare one, and a search of the literature reveals only a very limited number of cases, the great majority of which are reported from either the Continent or America.

The fracture is really an intra-articular splitting off of the articular face and underlying cancellous bone of the external condyle of the humerus, and the fragment is found to lie free in the cavity of the elbow joint as an intra-articular foreign body.

The Literature.

Lindem,[2] in 1922, reviewed the literature of seventeen cases, and discussed in detail a selection of them.

Hopkins,[3] in 1932, reported a case in a boy of five years, in which the capitellum and the tip of the external epicondyle were fractured, and the fragment was displaced and rotated laterally and lay outside the elbow joint. Reduction by manipulation was successful, with an excellent result.

R. C. Robertson and F. B. Bogart,[4] and H. Milch[5] have articles in *The Journal of Bone and Joint Surgery*, but this journal is not available for my perusal; similarly with two recent continental references.

Mechanism.

The mechanism is rather obscure, but in all cases the cause appears to be one of indirect violence, the force being transmitted through the radius.

Lindem[2] is of opinion that it may occur in one of two ways: first by a blow or fall on the upper end of the dorsum of the partially flexed forearm, the force being transmitted through the head of the radius to the capitellum (this was the mechanism in the case which is the subject of this paper); second, by a fall on the hand, the forearm being extended, the force being transmitted through the long axis of the radius in such a way that the head of the latter impinges on the capitellum and separates the articular surface and a layer of adjacent cancellous bone.

Wilms[6] has shown that the head of the radius may impinge on the capitellum by demonstrating a depression made by the radial head on the capitellum.

Displacement.

The fragment may be displaced either anteriorly or posteriorly, in both cases remaining intra-articular. There may also be some lateral displacement.

Rotation of the fragment is usually present.

Clinical Aspects.

1. There is a history of a fall, either on the hand with the forearm extended, or on the upper part of the dorsum of the forearm, the latter being flexed and under the body, the flexed forearm taking the majority of the force of the blow.
2. The degree of pain is exquisite and out of all proportion to the apparently trifling injury.
3. There is no apparent deformity, but there is extreme limitation of movement, and the patient finds himself with an utterly useless arm.
4. There is usually comparatively little local reaction, swelling is moderate in degree, but bruising is severe when it appears, which is quite late in the case.

5. No alteration in the normal position of the bony landmarks in the region of the elbow can be found.

6. An abnormal projection may be palpated in the antecubital fossa, if the fragment is displaced anteriorly, but even minor degrees of swelling will obscure this.

7. Severe degree of limitation of movement at the elbow joint, with the possible feeling of crepitus, or a sudden check to the movement, which is, in any degree, exquisitely painful.

8. Supination and pronation are not usually interfered with.

Diagnosis.

Diagnosis should be apparent from the points emphasized. It is, of course, confirmed by radiographic examination. In short, however, the diagnosis rests on the presence of a foreign body, of considerable size, in the elbow joint, found immediately after an injury. The condition differs clinically from a fracture of the head of the radius, where the portion of the radial head lies free in the joint cavity, only in that the head of the radius is found to be intact and moves with the shaft.

X Ray Appearances.

The radiographic appearances are characteristic (see Figures I and II).

Treatment.

In all cases the fragment should be removed, as soon as possible after the injury, by an open operation through a lateral incision, in front or behind as the case may be. The results are uniformly good, and full normal function is regained.

If the fracture is reduced and the fragment left, it usually becomes an intra-articular foreign body, gradually grows in size and causes very severe disability and traumatic arthritis, with its concomitant train of symptoms.

If reduction fails and operation is refused, the fragment may remain free and the above condition result, or callus may be thrown out, and it may join with the anterior or posterior surface of the lower humeral epiphysis, and cause a minimal degree of movement at the elbow joint in respect of the mechanical obstruction.

Case History.

Mrs. W.B., aged thirty-two years, was first seen by me in consultation on August 14, 1933. She gave the following history. On August 13, 1933, while walking over some loose stones and gravel, the patient stepped on one covered with seaweed and suddenly slipped and fell. She landed with her full weight on a boulder with her forearm under her, the upper part of the dorsum taking the major part of the shock. She was taken to her doctor, and on examination it was found that although the bony landmarks about the elbow were in correct relative position, there was exquisite pain in that region. There was marked limitation of movement of the elbow, very little local reaction in the way of swelling or bruising, no interference with either pronation or supination, and a completely useless arm. The arm was placed in a sling and a hypnotic was given that night.

On August 14, 1933, examination showed the patient to be a fit young woman in excellent general health, but obviously in pain. The left forearm was held rigid at right angles, the elbow region was definitely swollen, and the normal sulci were filled out; there was no bruising and no apparent deformity; the patient would allow only a few degrees of movement at the elbow joint before she complained of severe pain, but there was practically very little limitation of pronation and supination. The bony landmarks were in correct and normal relative position, no crepitus could be felt and nothing abnormal could be palpated in the antecubital fossa, although the swelling was marked here, and there was definitely fluid in the joint cavity.

General examination revealed nothing abnormal.

X ray examination (Figure I) revealed a fracture of the anterior half of the capitellum, rotated anteriorly through nearly 90°, and held in that position by the head of the radius, displaced anteriorly.

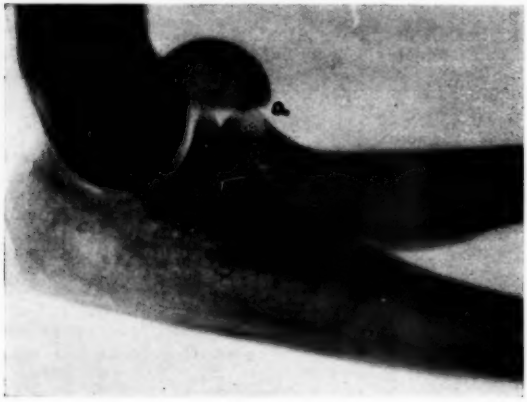

FIGURE I.

A diagnosis of fracture of the capitellum with anterior displacement and rotation of the fragment was made, and it was decided to attempt a reduction under general anæsthesia.

On the same day, under full ether anæsthesia, reduction was attempted, but swelling and fluid in the joint cavity made it very difficult to palpate the fragment. The attempt was thought, however, to have been successful, as flexion was found easily to be increased to about 75°, and the forearm and elbow were fixed in this position with strapping and the arm replaced in a sling.

Subsequent X ray examination showed that the fragment had been rotated anteriorly to over 100°, and that the anterior displacement had been increased; in short, the head of the radius had increased the rotation and anterior displacement and had carried the fragment proximally with it as the flexion was increased (see Figure II).

FIGURE II.

It was now obvious that the fragment was lying free in the elbow joint as a large intra-articular foreign body, and I advised an open operation to remove the fragment.

Operation was undertaken on August 15, 1933, under ether anæsthesia. A tourniquet was applied to the upper part of the arm, and an incision was made just posterior to the external supracondylar ridge over the joint line and head of the radius for about 8·75 centimetres (three and a half inches), with its centre over the external epicondyle. There was a considerable

amount of effused blood in the subcutaneous tissues, and the incision was deepened to expose the common extensor tendon. This was split in the line of the incision, and the anterior part was levered off the epicondyle and supracondylar ridge, exposing the capsule of the joint swollen, distended and fluctuating. The capsule was incised and the joint cavity was opened, a large quantity of fluid and blood was allowed to escape, the remaining clot being washed out with normal saline solution. The fragment was now seen to be in the anterior compartment of the joint and quite free except for a small ligamentous attachment. This was separated with a periosteal elevator and the fragment was removed. The joint cavity was washed out thoroughly with saline and 1% mercurochrome solution, and the capsule was closed with a few interrupted catgut sutures. The incision in the tendon was closed with a continuous catgut suture. A small rubber dam drain was inserted down to the tendon, and the skin edges were approximated with interrupted fishing gut stitches and a continuous dermal stitch. A tight bandage was applied, the tourniquet was removed, and the arm was held in a position of full flexion with a sling.

The fragment consisted of the whole of the anterior half of the capitellum, and measured 15 by 15 by 6 millimetres. The articular cartilage on the distal aspect of the fragment at *a* in Figure I was crushed and bruised. It was obvious that the head of the radius, receiving the force from the dorsum of the forearm, had struck the capitellum at this point, crushing the articular cartilage, and the force, continuing to act, split off the fragment.

After operation it was necessary to give morphine.

On August 16, 1933, the arm was very comfortable; it was dressed and the drain was removed.

On August 19, 1933, the patient was quite comfortable; the wound was dressed and was quite clean and healing well, while the swelling had begun to subside. The elbow joint was moved through 30° without any difficulty or pain.

On August 23, 1933, a little dermatitis was present in the antecubital fossa, probably caused by the preparation (picric acid in spirit) used before the operation; this was relieved with calamine lotion.

Massage and movements were begun on September 1, 1933, and an uninterrupted recovery took place, all movements rapidly returning.

On October 19, 1933, the patient had regained full use of the arm, and the power was very little less than on the other side. Full and normal pronation and supination were present and the range of movement at the elbow joint was only 2° or 3° short of full extension.

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ACROCEPHALO-SYNDACTYLISM (ACROBRACHY-CEPHALO-SYNDACTYLISM).

By M. P. Susman,
Sydney.

The unpleasant words in the title of this report have been coined for a condition characterized by certain malformations of the head and limbs. Up to 1920, twenty-nine examples of it had been recorded; these were thoroughly analysed by E. A. Park and G. F. Powers in the *American Journal of Diseases of Children* in 1920. This paper should be read by anyone who wants a detailed account of this strange condition. Other examples have been reported since, some of which are referred to in the bibliography.

Figure I.

Figure II.

The present case report is, I think, the first one from Australia. Probably the malady is more common than we suppose, if we can judge from personal communications; moreover, there are certain old prints (one is reproduced in the paper of Park and Powers) which show the deformities quite clearly.

The patients recorded since Park and Powers's review are essentially similar to the earlier ones, and we may make the following general remarks. The soft parts of the hands, feet and skull are never affected alone; the bones are always abnormal. The arms are more deformed than the legs. The malformations,

which occur particularly at the distal end of the limbs, tend to be symmetrical as well as bilateral. It should be noted that the parts of the body most affected are those which develop last, namely, the vault of the skull and the ends of the limbs.

FIGURE III.

The essential fault is synostosis, premature in the skull and aberrant in the limbs.

There are different degrees of deformity. In the hand, we usually find one of four main types: (*a*) Complete syndactylism. (*b*) The fingers are completely fused, but the thumbs are free, although usually deformed. (*c*) The little finger

as well as the thumb is free or partly free. (*d*) The little finger is partly free, but the thumb is completely joined to the other fingers.

In the foot we usually find (*a*) complete syndactylism, or (*b*) the great toe alone is free; usually it is in a position of *varus*. The bones of the carpus and tarsus are generally separate.

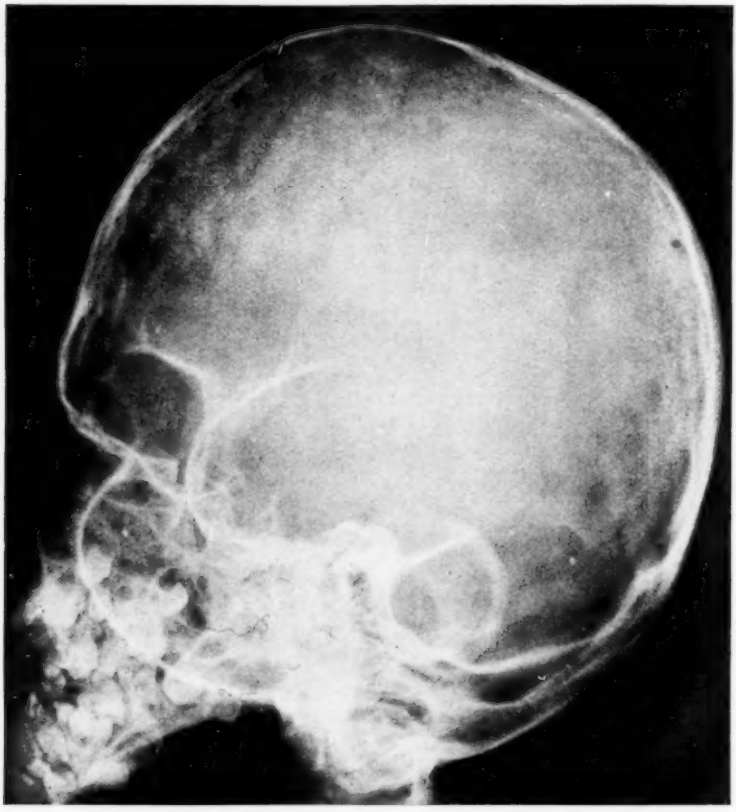

FIGURE IV.

In some instances the upper limb is shorter than usual, and there may be deficient movement of some of the joints, with or without synostosis of the radius and ulna.

In the head we usually find signs of increased intracranial pressure, such as increase in height and breadth and diminution in length of the skull, shallowness of the orbit, thinness of the inner table of the skull, atrophy of the convolutions of the brain, changes in the fundi. There may or may not be internal hydrocephalus.

Most of the old opinions about the causation of acrocephalo-syndactylism, such as syphilis and pituitary dysfunction, are now known to be untenable. The most likely hypothesis is that the defects are germinal in origin, depending either on an inherent defect or injury in the very early stages of development.

Description of Patient.

The subject is a boy aged eight years, moderately well developed physically and mentally. He has always had good health. The family history is clear; both parents and his four siblings are normal healthy persons, and there are no known abnormalities among more distant relations. The mother was aged forty-eight when this child was born.

He presents many of the characters found in the patients described by Park and Powers. I propose to discuss them quite briefly, as the photographs and skiagrams may well take the place of many words.

FIGURE V.

Left. Right.

FIGURE VI.

Right. Left.

The most noticeable points about the face are the dull expression, the bulging below the temples, and the wide separation of the eyes, which are unduly prominent and oblique. The left eye has a squint. In the head, note the height, the relative and actual broadness and the relative shortness. The occiput is flat and the forehead is steep, with poor superciliary ridges. No sutures or fontanelles are visible. All the bones of the vault are thin and have depressions on the inner aspect.

In the limbs we note the similarity of the deformities on the two sides. The malformation of the right hand is a little more severe than that of the left, in that the nails of the second and third "fingers" are united and the little "finger" is less distinct. On both sides the thumbs are recognizable as thumbs.

The skiagrams of the hand show ill-developed, deformed and fused phalanges; there is synostosis of the proximal end of the fourth and fifth metacarpal bones; the distal ends of the second and third metacarpal bones of the left hand deviate widely. The carpal bones are separate, and the lower end of the radius ulna is normal.

In the feet, all the nails are distinct and separate; in the photograph of the left foot the nail of the little toe is not seen; the *varus* position of the great toe is obvious, especially on the right side. The second metatarsal bone is more abnormal than the others, and is displaced outwards.

Summary.

Here is another example of acrocephalo-syndactylism, with a brief description of the main features and references to previous records.

Left hand. FIGURE VII. Right hand.

Left foot. FIGURE VIII. Right foot.

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THE RAPIDITY WITH WHICH MUCOSAL CHANGES CAN TAKE PLACE IN THE NASAL ACCESSORY SINUSES.

By K. STUART CROSS.

[From the Melbourne Radiological Clinic.]

IT is perhaps not generally known how rapidly mucosal changes may take place in the nasal accessory sinuses.

On occasions radiologists have been adversely criticized, sometimes without knowledge of it until long afterwards, for having made faulty diagnoses, only to find on inquiry that the patients had not been operated on until perhaps several weeks after their respective X ray examinations.

FIGURE I. "Chin-nose" view at original examination, showing gross mucosal swelling in right maxillary antrum and somewhat slighter similar changes in left.

The case here illustrated speaks for itself. Greatly swollen mucosa was present in both maxillary antra at the first examination, with an empyema on the left side, at least. Seventeen days later radiographic examination showed that all had disappeared, there remaining not a sign of any pathological changes in either antrum.

FIGURE II. Same view seventeen days later. Mucous membrane has subsided to normal (practically invisible) thickness.

FIGURE III. Lateral view taken at first examination, demonstrating fluid level (empyema) in left antrum.

The Australian and New Zealand Journal of Surgery.

All articles submitted for publication in this journal must be typewritten and double or treble spacing should be used. Each article should conclude with a brief summary and statement of conclusions. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without any abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal together with that of the journal in which the abstract has appeared, should be given, with full date in each instance.

When illustrations are required, good photographic prints on glossy gaslight paper should be submitted. Line drawings, charts, graphs and so forth should be drawn on thick white paper in India ink. Authors who are not accustomed to prepare drawings of this kind, are invited to seek the advice of the Editor if they are in any doubt as to the correct procedure. Skiagrams can be reproduced satisfactorily only if good prints or negatives are available.

VOL. IV. APRIL, 1935. No. 4.

A COLLEGE LIBRARY.

ONE of the first activities to be associated with the new College headquarters building which has just been opened in Melbourne, will be the founding of a library. Substantial progress has already been made towards this end, for, since the inception seven years ago of THE AUSTRALIAN AND NEW ZEALAND JOURNAL OF SURGERY, a considerable number of surgical journals which have been received in exchange for it from various parts of the world, have accumulated, and now form a substantial nucleus for the library. Apart from a large number of books which have been donated by various Fellows, the library at present contains fifty periodicals, the majority of which are devoted to some branch of surgery. Moreover, many offers of help have come from abroad: several surgeons in England and in America have promised to contribute, from their libraries, classical works on surgery that are now out of print, as well as complete sets of many of the standard surgical journals.

It is intended that the library should at first be developed as a standard reference library, and that, in its early stages, special attention should be paid to current literature. It is hoped that this reference library, when it is more fully stocked, will be made available, by means of a library service, to all Fellows throughout Australasia. Such an end would be attained by the appointment of a librarian who would be able to furnish abstracts from articles written in foreign languages, and who would, in addition, keep an index, not only of the surgical literature available in the College library, but also of that contained in other libraries in Australasia.

As soon as may be practicable, it is intended that a lending section shall be attached to the library. With this end in view, arrangements are now being made to obtain, from England and America, a continuous supply of reprints, which will furnish a "package" lending library. It is hoped that it will eventually be possible to stock this section of the library with books, and thus build it up for the benefit of Fellows in the far-out parts of Australasia.

A spacious, well-lighted and comfortably furnished room has been set apart for the library, on the ground floor of the new building. Mr. G. R. A. Syme is the librarian.

It is the wish of the Council of the College that those Fellows who are able to do so, should cooperate with it in developing the library. In this respect it wishes to acknowledge the gift by Dr. Norman McArthur of his library, and by Dr. Gardiner of the fruit of his research work into the literature of actinomycosis. The Council of the College aims at establishing, as soon as possible, a storehouse of surgical knowledge which will be available not only to practising surgeons throughout Australia and New Zealand, but also to any medical practitioner who wishes to conduct a research into surgical literature.

H. B. DEVINE.

Surgery in Other Countries.

[In this column will be published short résumés of articles likely to be of practical value from Journals published in other countries and not readily accessible to surgeons in Australia and New Zealand.]

Pain Attributed to Adhesions.

Professor Dr. A. W. Fischer, *"Über Deutung und Bewertung der sogenannten Adhäsionsveschwerden"*, *Der Chirurg*, August 1, 1934.

Fischer asks the question: "Why is it that, after abdominal operations, pains do not disappear, or that fresh pains arise?" He thinks that the diagnosis of adhesions as the cause of pain is made much too often. In answer to his question, he sets out the following points:

1. There may be an actual organic sequela of the illness, as, for instance, a fresh peptic ulcer following a successful gastro-enterostomy.
2. A new pathological condition may arise, as, for example, the formation of a marginal ulcer after a gastro-enterostomy.
3. An entirely new pathological condition may occur quite independently of the successful treatment of the original disease.
4. The original operation may have been performed on an erroneous diagnosis, as, for example, the pain which persists after the removal of what was thought to be a chronically inflamed appendix, but which was in reality due to a renal colic.

When the surgeon operates on a patient for pain in the right hypochondrium, and finds a soft walled gall-bladder with normal mucosa, it is by no means certain that the few stones present have caused the pain. A few adhesions between the gall-bladder and the omentum are probably of no significance, and probably cause no pain. Functional disturbances—painful contractions of the smooth musculature of hollow organs—are most frequently responsible for these pseudo "adhesion pains". Operation in such cases is unavoidable, as the correct diagnosis cannot always be established.

Another condition responsible for the "adhesion pain" after operation is that of "lowered function" in an organ. Surgical operation has been undertaken for a syndrome which in reality is due to a functional weakness in the stomach or bowel. To those who think purely in anatomical terms, such a condition with no gross or microscopic pathological change is difficult to visualize; but lay people know well enough that it exists. It is evidenced by the onset of painful contractions when the organ is called upon for effort, or even without this. The threshold of consciousness for muscular contraction is unduly low for many people, especially in women after oophorectomy, and in them muscular movements which should be entirely unconscious, are felt as pain, and become an indication for operation. The operation is, of course, useless and pains persist. These are, but should not be, ascribed to adhesions. Depressive mental states, such as the depressive phase of melancholia, are often accompanied by abdominal symptoms simulating organic lesions. Surgeons must avoid the danger of seeing neurosis in everything, and must remember that even hysterical patients may be really ill. A thorough physical examination must never be omitted. The subject is important, because in no branch of surgery is the differentiation between functional and organic complaints more important than in making a diagnosis of adhesions.

How do adhesions cause symptoms? They can, by band formations, cause obstructions, partial or complete. Radiologically, persistent narrowing of the intestine or a collection of gas may be seen. Adhesions *per se* cause pain when they interfere with peristalsis. This can often be demonstrated by an experienced radiologist. When adhesions cause pain *per se*, they are, as a rule, associated with persistent activity of some old inflammatory lesion. Again, the threshold of stimulation varies much in individuals, and it is theoretically possible that adhesions which are associated with old inflammation may cause pain by spasm only, but this must be rare. Strain of, or dragging on, an adhesion as a cause of pain is altogether unlikely. Pain can certainly be produced by inflating the bowel, but this is due purely to distension of the bowel. With regard to the demonstration of adhesions by endoscopy, or by X rays with pneumoperitoneum, the adhesions can certainly be demonstrated, but no proof of their pain-causing power is thus supplied.

Fischer summarizes his paper by stating that one can get a clear conception of "adhesion pain" only if one excludes a whole list of other causes. Although in the majority of cases neurosis is the main cause, there is a not inconsiderable percentage in which a correct diagnosis and correct treatment can effect a cure. The meaning and importance of "adhesion pain" is a subject in which the surgeon should take the lead. He must seek the aid of the radiologist, the psychiatrist, the neurologist and the physician.

A. BROWN.

BLOOD TRANSFUSION.

"Sitzungsberichte der I Konferenz für Bluttransfusion in Leningrad", Zentralblatt für Chirurgie, August 18, 1934.

THE proceedings of the conference on blood transfusion, held at Leningrad on December 19 to 21, 1933, are recorded. Only those discussions which break new ground, are here reviewed.

A. Filatov gave the indications for 1,300 transfusions done at the Institute for Blood Transfusion and first Surgical Clinic in Leningrad. They were divided as follows, the list giving a good broad outline of the general use of the method: Two hundred and eighteen were for exsanguination, acute or chronic; two hundred and fifty-three were performed in pre-operative or post-operative treatment of severe surgical conditions; twenty were given during operations; seventy-two were for severe traumatic or post-operative shock; fifty-five were given for various blood diseases; twenty-four were given for autointoxication in intestinal obstruction; twenty-nine were given for chemical poisoning; one hundred and thirty-five were given for general septic infections; two hundred and four were given in order to stop bleeding; fifty-seven were given for acholia or cholæmia; and two hundred and twenty-three were given for various other reasons.

The best results were obtained in cases of exsanguination and, next to this, in the pre-operative and post-operative care of patients.

In the treatment of blood diseases, Filatov regards blood transfusion as a useful adjunct to other methods of treatment. Vlados and Dulcin claimed some success in certain forms of blood disease, when supported by large doses of iron, but in aplastic anæmia, in myelogenous and lymphatic leuchæmia they think it is useless. Tusinskij holds that if liver does not produce an effect in pernicious anæmia in eight to ten days, a transfusion should be done. In cases of intestinal obstruction, its results have been questionable; Filatov's transfusion gave no results worth mentioning.

Transfusion gave good results in cases of poisoning by hedonal, chloroform and other poisons; and particularly in poisoning by such poisons as cause the formation of methæmoglobin (Marjanc). In these cases, it is wise to withdraw 500 to 1,000 cubic centimetres of the patient's blood prior to giving a transfusion of 500 to 8,000 cubic centimetres.

Results of transfusion in cases of sepsis were very disappointing. Levin and Kartasevskij claimed that the results of transfusing immunized blood were better. These authors report a case of sepsis in which the accidental transfusion of an incompatible blood brought about, to their surprise, a great improvement. The opinion was expressed that, in the later stages of infection, when a secondary anæmia was present, transfusion was beneficial, but at the height of the disease, when the reticulo-endothelial system was completely occupied with bacteria and toxic products, it was harmful. In correct dosage blood transfusion was successful in producing hæmostasis (Filatov). It was the best known method of arresting the hæmorrhage of peptic ulcer (Dzanelidze). The effective hæmostatic dose was 100 to 200 cubic centimetres of blood.

In acholia and cholæmia the results were said to be brilliant. Much discussion took place on the use of preserved blood. The Moscow Institute uses a preserving fluid known as I.P.K. (sodium citrate, 5; sodium chloride, 7; calcium chloride, 0·2; magnesium sulphate, 0·04; and distilled water, 1,000 parts). The three requisites of preserved blood were: bacteriological sterility, absence of hæmolysis and biological completeness. Preservation lasted up to fourteen to sixteen days. Reactions after using this blood were grave in 28·2%, moderate in 28·2%, slight in 24·4% and absent in 19·2% of cases. Latterly, "Karotin", a pro-vitamin *A* obtained from carrots and nettles, has been added to "I.P.K.". This increased the resistance of the red cells, and prolonged the period of safe preservation of the blood. The problem of hæmolysis was discussed. Glucose-citrate solution (sodium citrate, 5; *saccharum rubrum*, 4; distilled water, 1,000) produced the longest period of preservation—up to thirty days. The sugar was sterilized in an autoclave for forty minutes at a pressure of one and one-half atmospheres. The caramelization thus caused deprived the sugar of the danger of causing reactions. Addition of oxygen in the form of one or two cubic centimetres of hydrogen peroxide to 100 cubic centimetres of blood also increased its bactericidal power and its preservation period. Blood preserved in glucose citrate withstood shaking and warming better than blood in citrate or in "I.P.K.". Hæmolysis always sets in when blood is warmed to 48° C., and blood kept at 37° C. in an incubator underwent hæmolysis five to six days earlier than when kept in an ice-chest. In summarizing his paper, Bogdanov said that as preserved blood gradually lost its biological properties, it was, on the whole, inferior to fresh blood, but it had special advantages in accidents and war injuries. On the other hand, Kartasevskij said that the results of preserved blood were in no way inferior to those of fresh blood. It had been used in Leningrad now for eighteen months, and in all 156 litres had been injected in 292 cases. No blood more than ten days old was used. Abramson pointed out that preserved blood should always be filtered, as small clots were found in it. He found a more severe reaction to preserved than to fresh blood. Hesse stated that the slightest trace of reddening of the plasma indicated that the blood was dangerous. He quoted two deaths from the use of preserved blood kept for eighteen days, the cause of death being due rather to a denaturing of the albumin than to a hæmolysis. Several speakers referred to the use of a synthetic antithrombin, in use in Russia under the name of "Synanthrin 27" and "Synanthrin 33", 1·5 cubic centimetres of which will maintain one litre of blood for ten to thirteen days in a condition suitable for transfusion.

The organization of blood donor services was discussed. The service in Leningrad is highly organized. To assist in blood regeneration, donors receive special rations from the State. These consist of liver, milk, eggs and butter, the caloric value of which per month is 29,345. They receive 25 roubles per 100 cubic centimetres of blood given. Each donor has a card containing all essential information, including the results of various tests, amounts of blood taken and dates. Not more than 350 cubic centimetres were taken at once from women, and 500 cubic centimetres from men. Blood was not taken oftener than once a month. It must be taken by needle puncture, not by venesection. Two-thirds of the donors were women. Generally donors were typed against the patients, but universal donors were also used. Women were found to stand a

single blood loss better than men, but their blood regenerated more slowly. Regeneration was also slower when the donors were at work than when at rest.

Kartasevskij read a paper on the transfusion of plasma only. He stated that when used for the purpose of hæmostasis only, it was equal to whole blood. The incompatibility of the different groups was less. It could be preserved with safety for several months.

Skundina spoke on the transfusion of blood obtained from dead bodies. This had been carried out in Moscow 350 times—100 without the use of citrate or any other stabilizing solution. There was an absence of the usual clotting in "dead" blood. This was analogous to the absence of clotting of blood effused into serous and synovial cavities.

Popov discussed the study of blood grouping with regard to the chemistry of the various factors of incompatibility. The chemical nature of agglutinogen and its qualities and variations were set forth in interesting detail. The depth and breadth of the work being done on these lines is surprising, but those interested must be referred to the original papers.

Post-transfusion reactions came in for particular notice. Professor Hesse gave a very interesting report of Petrov's experimental work on animals. He divided reactions in three types: the non-specific protein reaction, hæmolytic shock, and anaphylactic shock. With regard to the first, Hesse believes in Lewissohn's explanation that it is due to faults in the distilling of the water, or in the cleansing of vessels. He required water used in transfusions to be thrice distilled, and insisted on special methods of cleansing vessels used in blood transfusion in the Leningrad Clinic.

Hæmolytic shock was the most dangerous of all complications. There were four grades of it. The acute type was associated with cardio-vascular failure and death in half to seven hours; this was rare. More often the stormy symptoms passed over into a further period in which renal insufficiency dominated the picture, and death occurred in from five to fourteen days. Next in severity was an acute attack with transitory symptoms, compensation occurring as the hæmolysed blood was taken up by the liver and spleen. Lastly, there was the late group, with symptoms making their first appearance after twenty-four hours. Universal donors were dangerous in this respect, and, without typing, were not much used in Leningrad. They were used only when less than 100 cubic centimetres of blood were to be transfused, and when the recipient's red cell count was above 2,000,000 per cubic millimetre. In animals good results in cases of hæmolytic shock were produced by the prompt reinfusion of properly compatible blood.

Anaphylactic shock was to be feared from repeated transfusions. There was no specific treatment, but calcium relieved the bronchospasm. Other papers dealing with various scientific aspects of the subject were read, and the discussion on all papers was very full.

A. BROWN.

POST-OPERATIVE CIRCULATORY CONDITIONS.

Professor Dr. W. Ewig, *"Über die Grundlagen zur Erkennung Postoperativer Herz-und Kreislaufstörungen"*, *Der Chirurg*, October 15, 1933, page 774.

IN post-operative circulatory conditions the author distinguishes three great groups. It is, he states, necessary to know to which one of these a circulatory failure is attributable: (i) failure of the heart, (ii) failure of the tonus of the peripheral vessels, (iii) disturbance in the capillary circulation.

Clinical picture of heart failure is as follows: The systolic volume of each heart stroke becomes less, and the heart seeks, through increasing the frequency of the pulse, to diminish the effect of the lessened systolic output. If this does not succeed, then the amount of blood thrown out of the heart per minute diminishes, and the heart minute volume is lessened. As a consequence all

the blood which passes from the periphery to the heart is not again furnished to the arterial system. The heart weakness then becomes manifest, and a chain of events occurs. The blood stagnates in the lung. This causes a decrease of the vital capacity. The stagnation leads to congestive catarrh in the base of the lung. Congestion can sometimes be radiographically recognized by X rays before operation, the lung being darker owing to increased vascular content. The blood pressure may not be altered; it can even remain relatively high. Cyanosis and dyspnœa are not necessarily present while the patient is at rest. It will be noticed that the patient, when talking, cannot utter long sentences with a single breath. The classical symptoms of heart weakness may not be present.

Early symptoms, and therefore those that should be recognized, are: (i) Increase in venous pressure shown by: (*a*) an increase in the size of the veins in the arms and neck; (*b*) an enlargement of the liver.

(ii) Urinary changes. Urobilinogen appears in the urine as a sign of insufficient circulation in the liver; the urine may contain a trace of albumin, and its specific gravity increases; the amount of urine diminishes, especially in the day, but in the night there is an increased flow.

In these cases the examination of the heart may show little or nothing.

In regard to failure of the peripheral vessel mechanism, it is unimportant from the practical point of view whether failure is caused by vasomotor paresis, by capillary paralysis and plasma loss, or by loss of blood. All these conditions can be grouped under the term "collapse" or as "collapse-like condition"—the principle is the same, in that the "stream bed" is too great for the amount of circulating blood. In this collapse-like state the veins near the heart are almost empty; the veins of the arms are collapsible; the venous pressure is low; the liver is not palpable; there is no nocturia and no albumin or urobilinogen in the urine; the patient is pale; the skin is moist; the tissue is not turgescent; the cheeks are sunken; the eyes lie deep; the lungs are empty of blood; the breathing is shallow and rapid. Unlike the dyspnœic patient, who prefers the sitting position, the patients prefer the horizontal position. The function of the heart is impaired, because it does not receive in its coronary vessels enough nourishing blood. Such a deficient blood supply has a more deleterious effect on the heart of an old or fat person. In some cases both a vessel insufficiency and a heart weakness are present, and moreover it is often difficult to determine whether the heart weakness is primary or secondary. Simple clinical observations may not indicate which kind of circulatory disturbance is present.

Heart insufficiency shows itself by decrease of the systolic output and therefore of the "minute volume", and also by an increase of venous pressure. The amount of circulating blood in the "peripheral vessel system" is not lessened, but usually is increased. The "peripheral vessel insufficiency", on the contrary, is considerably decreased, the venous pressure sinks, the systolic output—the minute volume—is less than in heart insufficiency. In order to recognize the nature of a post-operative circulatory disturbance, it is therefore necessary to examine simultaneously the three important circulatory components: the amount of the work of the heart, the venous pressure, the amount of circulating blood.

The amount of the circulating blood can be estimated by injecting a measured quantity of a solution of Congo red and colorimetrically determining its dilution by the blood. The venous pressure can be measured exactly by the method of Moritz-Tabora. The amount of work of the heart is much more difficult to estimate. It is necessary to know how much blood the heart with each single stroke pumps into the arterial system; that is, to be able to estimate how much blood in a minute is furnished by the systolic beats—the heart-minute volume. This can be determined by the Grollman's acetylene method. By this method it is possible to recognize alterations in the heart-minute volume and to see in its decrease the nearness of danger, since the intact circulation, after an operation, reacts with a quick recovery of the minute volume. Since this method is a complicated one and not always applicable clinically, Lijestrand and Zander have suggested a simple clinical method which, at any rate, may be used for com-

parative measurements. In this method what they call the amplitude frequency product (A.F.P.) is determined. Although the A.F.P. is not accurate, it is of value in comparative examinations before and after operations, and in testing the patient before an operation with a known amount of work. It does not show the absolute heart-minute volume. However, when this method is checked by the Grollman's acetylene method, it gives a variable degree of accuracy, and although it is not a correct indication of the heart-minute volume, it shows correctly in the same person the alterations in the heart-minute volume.

H. B. DEVINE.

Reviews.

FRACTURES, SPRAINS AND DISLOCATIONS.

The Management of Fractures, Dislocations and Sprains. By J. A. KEY, B.S., M.D., and H. E. CONWELL, M.D., F.R.C.S.; 1934. St. Louis: The C. V. Mosby Company. Super royal 8vo., pp. 1164, with 1165 illustrations. Price: 84s. net.

THE enormous increase within the last few years in the number of injuries and in their severity, especially those due to road and industrial accidents, has stimulated a special interest in traumatic surgery. Although in Continental countries periodicals are devoted to this subject, there are none in the English language. Nevertheless in recent years a large number of new books on fracture treatment have been published, the latest and by far the largest being the book by Key and Conwell. The authors obviously write from considerable experience and have been well known for a number of years as experts in the subjects with which they deal so ably.

The authors point out in the preface that: "The physician in the smallest town may suddenly be called to the aid of a patient suffering a severe fracture . . . for this reason a special chapter on Emergency Treatment has been included." The completeness of this book may be gauged from the fact that there are chapters on the medico-legal aspects of fracture cases, workers' compensation law, a special chapter on fractures of the skull and brain trauma by Dowman, and of the jaws and related bones of the face by J. B. Brown.

Occasionally the two authors set out two different views which represent the choice of treatment that each author would adopt. Alternative methods of technique are sometimes mentioned, but specific directions as to the choice of method are not always given. Though it may sometimes be difficult for an author to give specific directions, they are often needed by the isolated surgeon in the country.

Adding to the magnitude of the book there is in the several sections an account of the surgical anatomy, clinical examination and description of the pathology as a preliminary to the consideration of treatment. To some this may appear unnecessary; we would not agree with this view.

Compound fractures are fully and ably dealt with, but at the same time fuller details of the operation for wound excision, drainage *et cetera*, could have been introduced. Few experienced surgeons will agree "with small puncture wounds due to extrusion of fragments from within and in carefully selected cases in which the skin is broken by the fracturing force, but in which the evidence indicates that the site of fracture is not contaminated, these compound fractures can be treated conservatively; that is, the wound in the skin should be swabbed with tincture of iodine and a dry sterile dressing or sterilized vaseline gauze

applied". Such wounds, like all others, whether associated with a fracture or not, should be surgically excised, if seen within six to eight hours of infliction. Nearly forty years have passed since Volkmann's classical experiments and observations were published in 1898, and they have proved, especially during the War, that the best method of cleaning a wound is not by physical, chemical or bacteriological agents, but by aseptic surgical excision of all contaminated tissues. By means of excision, osteomyelitis, cellulitis, gas gangrene *et cetera* can be best avoided in the treatment of fractures. The authors have even illustrated cases in which their conservative treatment has been carried out; moreover they advise such treatment in more than one place in the book. That such a method is risky is shown by their own statement: "In the meantime the patient is watched closely and if any signs of infection occur drainage is instituted immediately." Unfortunately by the time infection occurs the golden opportunity to render a contaminated wound sterile is gone for ever and gas gangrene may even have developed.

The enormous range of subjects includes acute bone atrophy (Sudeck's disease), which is common and troublesome; tennis elbow; malunited fracture treatment; reduction of old dislocations; traumatic low back pain, acute, chronic and recurring. Cases of traumatic low back pain are stated to be "the bane of the industrial and orthopædic surgeon". Rest in the early or acute stage and their unfavourable impression of the results of manipulation for the chronic cases are observations with which most will agree.

The account of fractures of the spine is the most complete in any book in the English language. This section is a reflection of the improvement that has taken place within the last five years in the treatment of this common and serious injury.

For medial fractures of the neck of the femur both the Whitman method and the introduction of a Smith-Petersen nail by a large arthrotomy and the exposure of the fracture site are described. The indications for each method are discussed. The extraarticular introduction of the nail is not discussed, although the method has gained much favour in Scandinavian and German countries.

Naturally, skeletal traction is fully dealt with. The useful method of incorporating pins, inserted into the bone, above and below the site of fracture and then incorporating them in a plaster cast whilst the limb is extended on an orthopædic table is not discussed.

There is a good account of Colles's fracture, and attention is drawn to the danger of redisplacements occurring in some cases after the application of the splints if immobilization is not prolonged. For ununited fractures of the carpal scaphoid a small bone graft is advised. Reduction of recent dislocations of the semilunate bone is mentioned. Indeed little has been omitted from this book.

It is a volume that can be recommended as up to date; it should be of great value as a reference book, especially to those occasionally called upon to deal with these injuries.

LABORATORY METHODS FOR THE CLINICIAN.

Manual of Clinical Laboratory Methods. By P. S. DIMMITT, Ph.G.; 1934. Philadelphia: F. A. Davis Company. Demy 8vo., pp. 165, with illustrations. Price: $2.00 net.

THE author of "Manual of Clinical Laboratory Methods" is Medical Technologist for the Stout Clinic, Sherman, Texas. Already the number of works, both large and small, on this subject is legion, and certainly there can be no general demand or need for more. It is better to select one of the larger and better known

texts and to keep oneself up to date with new editions. This particular manual is interesting in that it apparently details methods used in the University of Texas and in local hospital and "clinic" laboratories. It is nicely printed on excellent paper and the illustrations are on the whole well chosen, but are nearly all borrowed from other books and papers. Laboratory techniques are set out in orderly fashion; some are well chosen and in general use, others apparently are of local origin and of greater interest. This setting down of selected laboratory methods may be of considerable practical value to the author and local teachers, students and graduates.

A TEXTBOOK OF SURGERY.

Rose and Carless' Manual of Surgery for Students and Practitioners. By C. P. WAKELEY, D.Sc., F.R.C.S., F.R.S., and J. B. HUNTER, M.Chir., F.R.C.S.; Fourteenth Edition; 1933. London: Baillière, Tindall and Cox. Royal 8vo., pp. 1495, with illustrations. Price in England: 30s.

THE fourteenth edition of "Rose and Carless' Manual of Surgery" follows closely the general method of presentation adopted in previous editions. A textbook that has passed through fourteen editions since 1898 cannot do otherwise than give to its readers the considered opinion of teachers of surgery in one of London's best known hospitals. "Rose and Carless" has always contained the solid foundations of pathology and the principles of surgery that are essential for a sound surgical training, and the present edition in the main lives up to its predecessors in this regard.

The first twelve chapters have departed but little from those in previous editions. Fortunately it has been recognized by the authors that less space devoted to bacteriology and immunity and allied subjects is a distinct gain, and perhaps it is not too much to hope that in future editions further pruning may be achieved. It is very doubtful whether the student derives benefit from the incomplete and scanty discussions on these subjects, and we feel that the space could be better utilized in making more vital and interesting the earlier chapters of the book. This same criticism applies to the chapters on anæsthesia, diseases of the eye, ear, and female genital organs.

It must be confusing to the student to find the present-day clinical work so divorced from teaching. He will have to search many hospitals to find Leiter's tubes, blood-letting, wet and dry cupping, Klapp's suction balls, cantharides paint, counter-irritation with actual cautery, used with a frequency or holding a place of importance in treatment that makes them worthy of a prominent place in this book. The student should be conversant with the customs and methods of the past, but it would simplify things for him if, after the method was described and its action and uses were explained, some indication was given of the position it now holds.

The description of specific infective diseases has changed but little. The patient suffering from syphilis should get much more efficient treatment than is suggested here.

Tumours and cysts are well done, but, even to those hungering after knowledge, the introduction of the terms "pulp" and "rind" add to an already long list of classifications.

The preparation of catgut makes the problem too simple to be a true indication of the difficulties and dangers encountered. The result of the work of the Medical Research Council and that of other recent investigators should make the student appreciate these difficulties.

The diagram illustrating exposure of the middle meningeal artery and also the text describing subtemporal decompression both lead the reader to believe

a temporal muscle flap is turned down. This is curious in view of the insistence of cranial surgeons that a vertical muscle-splitting incision should be used, if troublesome complications are to be avoided later on.

Mallet finger is described and the difficulty of satisfactory treatment is indicated, but the diagram illustrating the text is not helpful.

The sections on nerves, muscles, deformities, orthopædics and fractures are concise and satisfactory. The section on fractures particularly shows evidence of recent progress and, apart from those of the jaw, is well done.

It is an obvious omission that neither in diseases of bone nor under the parathyreoid gland is the condition of hyperparathyreoidism mentioned.

Recent proved methods of treatment are mentioned freely in various sections of the book, such as the Watson Jones extension treatment for fractured spines and the Orr treatment for osteomyelitis, but the suggestion of an Albee bone graft for immediate fixation of a fractured spine does not meet general acceptance.

The sections on brain and intracranial tumours are too condensed. An osteoplastic flap is surely not "a serious procedure attended by considerable shock and hæmorrhage" if it is done by a competent surgeon. In the treatment of concussion insufficient stress is laid on the indications for the various divergent lines of treatment at our command.

In the section dealing with radium treatment of carcinoma of the tongue the reader gets the impression that operation is the method of choice in the earlier cases and that radium should be used for advanced cases associated with fixity of the organ. Is not this distinction ceasing in favour of radium in all lingual carcinomata? Neither can we agree with the following statement concerning radium treatment of carcinoma of the breast: "At the end of the month an opinion can be formed as to the success of the treatment."

In two sections of the book where hydatids are mentioned (lung and liver) it is obvious that the terms "ectocyst" and "endocyst" are not used in accordance with nomenclature usually adopted in countries where hydatid is common. Ectocyst appears to be confused with the adventitious capsule or pericyst. The possible results of diagnostic aspiration of hydatid of the liver are too serious to be considered.

The section on abdominal surgery is sound, but the treatment of post-operative "peritonism" by purgation and calomel in divided doses is becoming a thing of the past in most hospitals.

The subject of appendicitis is dealt with in such a way that it cannot be a satisfactory guide for the student. The treatment outlined on page 1127 must prove disastrous to both patient and surgeon if generally adopted. We require more certain knowledge of what is going on in the abdomen than we have at present, before we can watch a patient to the third day.

The urinary system is dealt with briefly, but the important facts are mentioned. Open operation for villous papilloma of the bladder cannot be justified simply because the surgeon does not possess a diathermy machine. Catheter life takes too prominent a part in the treatment of the enlarged prostate, and the student is liable to get a faulty idea as to the position surgery should hold in this condition. Prostatic conditions have not on the whole been brought into line with the progress of the last few years.

It may appear that the reviewer has concentrated upon what he considers weaknesses. This has been done deliberately for two reasons: first, that it is the duty of an honest reviewer to point out weaknesses so that they may be remedied in a future edition and, second, because of his desire to see a textbook which has rendered such magnificent service as "Rose and Carless" brought up to the highest pitch of perfection. In the main, the points chosen for criticism are trivial in comparison with the vast concentration of knowledge and sound surgical principles for which this book has been famous in the past.

A SURGICAL HANDBOOK.

Surgery of a General Practice. By A. E. HERTZLER, M.D., and V. E. CHESKY, M.D.; 1934. St. Louis: The C. V. Mosby Company. Large 8vo., pp. 602, with 427 illustrations. Price: $10.00 net.

THIS book is a modification of a previous work by the same authors ("Minor Surgery", 1930). The authors lament the passing of the general practitioner; so that, presumably, this work is not written for him. They admit they do not know what to include and what to omit, but they have designed it as a handbook for the surgeon in his "office". Their aim has been to include a short description of those diseases which can be treated in a small operating theatre attached to the consultant's rooms. Only one treatment, and that time tried, has been described for each condition. In some cases these descriptions are elaborate, and in others sketchy. The treatment of diseases of the anal region is particularly well, if briefly, done. In our opinion the rare infections, such as tularæmia and sporotrichosis, are described too fully to the exclusion of more common conditions.

Only half a page is devoted to cancer of the tongue, "a cure of which is scarcely to be hoped for"! Radium is not mentioned in its treatment. A very full chapter is devoted to the differential diagnosis of the pathology of the breast, while the treatment of burns, urethral stricture and infections of the hand are glossed over rather cursorily. Surely the last mentioned is one of the most important subjects in surgery.

The book ends with a short chapter on bandaging and another on descriptions of sutures, but the method of preparing the sutures is omitted. There is a good illustration on almost every page. Each picture shows clearly what it is meant to portray, and the book is worth having if only for these. The diagrams, too, illustrating the sites of injection for local anæsthesia, are particularly good. Although it is not an exhaustive treatise of all the diseases described, we feel that this book is the summary of an American surgeon's personal experience. Simplicity has been his note.

FRACTURES OF THE NECK OF THE FEMUR.

The Operative Treatment of Collum Femoris Fractures. By SVEN JOHANSSON, M.D.; 1934. Copenhagen: Levin and Munksgaard. Large crown 8vo., pp. 148, with 157 illustrations. Price: 18s.

A SATISFACTORY "blind" method of introducing a Smith-Petersen nail in fractures of the neck of the femur would be very acceptable. The majority of the patients are elderly and feeble, and a procedure involving the minimum risk of shock and sepsis is much to be desired. The difficulty lies mainly in gauging accurately the degree of anteversion of the neck, so that the nail will lie in the correct ventro-dorsal plane and thus pass along the neck into the head. This angle, of course, varies considerably, and many authorities consider that open exposure of the fracture is essential to success.

Sven Johansson, in his altogether admirable brochure, overcomes the difficulty by a preliminary X ray examination of the sound hip in both antero-posterior and lateral directions, and from the results calculates both the length of the nail required and the degree of anteversion of the neck. If now the injured limb is internally rotated to the same degree as the anteversion, the neck will lie in the coronal plane, or with the patient supine the neck will be horizontal. With the patient on a traction table the fracture is reduced, the injured limb is internally rotated to the required degree, and a stiff steel wire is drilled from just below the trochanter through the neck into the head. In order to insure that the wire is horizontal the drill is fixed in a clamp furnished with a water

level. When the position of the wire has been confirmed by X ray examination, the Smith-Petersen nail, canalized along its centre, is threaded over the wire and driven home with a perforated punch. The wire is then removed, and the wound over the trochanter is closed.

The above is an idealized description of the method. Actually, from the text, it appears that the X ray control of the position of the wire is the matter of greatest importance, numerous exposures being made both after reduction and after the insertion of the wire. The wire is regarded only as a guide to the direction which the nail must take, and not as an actual pilot; any deviation of the nail from the line of the wire is likely to buckle the wire and render its removal exceedingly difficult.

In addition to the description of the special technique there are valuable chapters dealing with the reduction of the fracture and the after-treatment. The author gives prominence to the importance of obtaining full abduction and extension before commencing internal rotation, in order to avoid rotating the head. A strong lateral pull is useful to prevent this complication, but although the author mentions this (Tavernier's manœuvre), he does not consider it necessary if abduction and extension precede internal rotation.

As a general rule, patients are kept a month in bed. Graduated weight-bearing is then permitted, first in a machine, then with crutches, and finally without support. The walking caliper, which always appears to throw additional strain on the neck of the femur, is not used. The average stay of the author's patients in hospital was about 80 days. Unless causing pain, the nail was not removed.

In the tabulated 50 reports the author has included every case operated upon by this method, and the results must be regarded as excellent. There were five deaths, two from pulmonary embolism, and the other three from conditions not directly associated with the operation, namely, cerebromalacia, nephro-sclerosis and pyelonephritis. Three patients were still under treatment, and all of the others had osseous union. The functional result in every case, except one, was good.

The skiagrams, which are beautifully reproduced, indicate a high degree of skill in reducing the fractures and remarkable accuracy in placing the nail.

This small brochure will be found of special interest to the orthopædist, and is one which he should have on his shelves.

CONDITIONS OF THE GASTRO-INTESTINAL TRACT.

Modern Aspects of Gastro-Enterology. By M. A. ARAFA, M.R.C.P., with foreword by A. F. HURST, M.D., F.R.C.P.; 1933. London: Baillière, Tindall and Cox; Australia: Angus and Robertson. Royal 8vo., pp. 374, with 56 plates. Price: 42s. net

IN these days, when the treatment of peptic ulceration and of other chronic abdominal conditions is becoming more and more the province of the physician, it is good to read in Arafa's "Modern Aspects of Gastro-Enterology" a clear, concise study of some diseases of the alimentary tract from a modern medical point of view. Although there are many references to work on the Continent, the bulk of the subject matter of this book is derived from the first-hand teaching of Dr. A. F. Hurst at Guy's Hospital, to whom the author is duly grateful. The method of approach of each subject is typically Hurstian. The clinical symptoms, physiology and pathology are written in accordance with this school of medicine. The investigations that should be carried out in alimentary disease, their reliability and their limitations, are clearly set down. A few more notes on technique might make the book a standard work in this respect.

The modern conception of gastritis is well put down, its frequency is stressed, its diagnosis by radiology, as well as by test meal, is fully discussed, and the use

of a peroxide solution in its treatment is rightly preferred to that of weak alkalis. The radiological technique (Berg and Forsell) of visualizing the mucous membrane by distributing a watery suspension of barium over the gastric mucosa is detailed and its advantages are stressed. The accompanying skiagrams demonstrate well the increase in size and spacing of the rugæ of the stomach which is found in the hypertrophic type of gastritis.

A full chapter is devoted to the study of peptic ulcer. The modern theories of its ætiology are summarized and the clinical and laboratory aids in its diagnosis are clearly set down. The medical treatment of Hurst (who has perfected it) is described in detail, and the rôle of infective foci is very fairly discussed. This chapter includes the indications for surgical treatment as viewed by the physicians at Guy's Hospital, and the prognosis of each type of operation is appended. It is pointed out that in some clinics ulcerations after gastro-jejunostomy for duodenal ulcer recur as frequently as in 50% of cases. The author rather weakly reiterates the very strong views of Hurst that the ambulatory treatment of ulcer should not exist.

A useful chapter is devoted to the investigation and diagnosis of diseases of the colon. The X ray diagnosis of ulcerative colitis by the appearance of mottling and/or dehaustration is included. The value of the sigmoidoscope in the differential diagnosis of colonic ulceration is emphasized, the sigmoidoscopic appearances being particularly well described and illustrated.

The author relates the views of consultants of the present day in Europe in assessing the value of cholecystography: "adhesions are too often diagnosed when normal conditions are found at operation". He points out that a deformity in the gall bladder shadow does not necessarily mean an adhesion; it may be due to a certain position of the patient or to other causes. These pseudo-deformities disappear after the egg meal, and this does not occur when the gall-bladder is encircled with granulation or fibrous tissue.

The book ends with a helpful chapter on practical dietetics.

If any criticism could be raised, it is that more space should be devoted to chronic appendicitis. The author remarks: "Radiology is the most reliable means of diagnosing chronic appendicitis, and no case should be operated upon without such evidence . . . . The most important sign of chronic appendicitis is the presence of maximum deep tenderness over the appendix as visualized by the X-Ray." This should be driven home. The diagnosis and treatment of constipation might be collected with advantage into one chapter.

Although this is not an exhaustive treatise on diseases of the alimentary tract, it is a useful book in outlining what is normal and what criteria some physicians in Europe use at the present time to designate an abdominal organ as diseased. Everywhere the illustrations and skiagrams are excellent.

Proceedings of the Royal Australasian College of Surgeons

ANNUAL MEETING.

At the annual meeting of the Royal Australasian College of Surgeons, held at Melbourne from March 4 to 9, 1935, the following business was transacted.

Election of President.

As Sir Henry Newland intimated that he did not wish to seek reelection, Mr. R. B. Wade, of Sydney, was unanimously elected to the presidency of the College. The Council placed on record its very great appreciation of Sir Henry Newland's efforts on behalf of the College during the six years of his term of office. The Council noted the remarkable progress made by the College during this six years, and realized its debt of gratitude to Sir Henry Newland for his efforts on behalf of the College.

Election of Office-Bearers.

The following office-bearers were elected:

Vice-Presidents: Sir Louis Barnett and H. B. Devine.
Censor-in-Chief: Alan Newton.
Honorary Secretary and Treasurer: Julian Smith, junior.
Honorary Assistant Secretary: G. R. A. Syme.
Executive Committee: R. B. Wade, H. B. Devine, A. L. Kenny, Alan Newton, Julian Smith, junior.
Honorary Librarian: G. R. A. Syme.

State and Dominion Committees.

New South Wales: A. J. Aspinall, George Bell, H. R. Dew, B. T. Edye, J. W. S. Laidley, Sir John McKelvey, Guy Antill Pockley. (Council members, *ex officio*, R. B. Wade, H. R. G. Poate, F. P. Sandes.)

Queensland: A. G. Anderson, H. S. McLelland, J. C. Hemsley, A. V. Meehan, W. N. Robertson, Neville G. Sutton. (Council member, *ex officio*, E. D. Ahern.)

South Australia: A. M. Cudmore, H. M. Jay, I. B. Jose, L. C. E. Lindon, Bronte Smeaton, T. G. Wilson. (Council member, *ex officio*, Sir Henry Newland.)

Tasmania: F. W. Fay, J. Bruce Hamilton, D. H. E. Lines.

Victoria: Victor Hurley, Fay Maclure, R. H. Morrison, J. Newman Morris, C. Gordon Shaw, J. H. Shaw, B. T. Zwar. (Council members, *ex officio*, H. B. Devine, A. L. Kenny, Alan Newton, Balcombe Quick.)

Western Australia: F. J. Clark, H. B. Gill, D. D. Paton.

Dominion of New Zealand: Sir Hugh Dyke Acland, Professor F. Gordon Bell, F. S. Batchelor, Sir Donald McGavin, Sir Carrick Robertson, D. S. Wylie. (Council member, *ex officio*, Sir Louis Barnett.)

State and Dominion Hospital Committees.

The Hospital Committees in the various States and in the Dominion of New Zealand were reelected. The names of the members are as follows:

New South Wales: Archibald John Aspinall, Cyril Ernest Corlette, Thomas Hamilton, Sir John Lawrence McKelvey, John Brooke Moore, Clarence Read, Herbert Henry Schlink, Robert Blakeway Wade, Ralph Worrall.

Queensland: Edward Dennis Ahern, Graham Patrick Dixon, James Cameron Hemsley, Alan Edward Lee, Arthur Vincent Meehan, Hugh S. McLelland.
South Australia: A. M. Cudmore, H. Gilbert, H. M. Jay, I. B. Jose, Sir Henry Newland, T. G. Wilson.
Victoria: A. E. Brown, H. B. Devine, T. E. Victor Hurley, A. F. Maclure, J. Newman Morris, Alan Newton, C. Gordon Shaw, Henry Searby, B. T. Zwar.
New Zealand: Sir Hugh Dyke Acland, Sir Louis Barnett, F. Gordon Bell, Sir Carrick Robertson, Sir Donald McGavin, T. D. M. Stout, H. M. Wilson, D. S. Wylie.

Election of Fellows.

The following Fellows of the College were elected by the Council:

Fellows Admitted under the Old Regulations.

New Zealand: H. W. Fitzgerald.
Queensland: M. H. E. Smith.
Tasmania: C. B. Berryman.
Victoria: C. V. Stephens.

Fellows Admitted after Examination by a Board of Censors.

The following were elected Fellows in Surgery:
New South Wales: E. W. Buckley (exempted by the Council from the senior surgical degree qualification), George G. L. Stening.
South Australia: A. L. Dawkins.
Victoria: Albert J. W. Ahern, David Officer Brown, F. J. O. Colahan, E. W. Gault, Paul Jones, E. E. Price, John B. Turner, John G. Whitaker, Roy D. Wright.
The following were elected in laryngo-otology:
Victoria: Jean Littlejohn, Thomas G. Wynne.

Editorial Notices.

EDITORIAL communications should be addressed to the Chairman of the Editorial Committee, 57 Collins Street, Melbourne, or to any member of the Editorial Committee. It is understood that original articles forwarded for publication are offered to THE AUSTRALIAN AND NEW ZEALAND JOURNAL OF SURGERY solely, unless the contrary be stated.

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